NOVEMBER 1958

the Airman

OFFICIAL JOURNAL OF THE AIR FORCE

GOVERNMENT PUBLICATIONS DEC 1 1958 CLEMSON LIBRARY

ALASKA - page 4

THANK YOU, MR. SEWARD

William Seward, keen and canny,
Thank you, Sir, for Klondike Annie!
Thanks for Nome and Fairbanks, too,
For salmon, Esquimaux and DEW.
But what's most gratifying is
Your knowledge of the icebox biz—
You bought all that Alaskan ice
At Alexander's asking price!

—W. H. von Dreele

REPRINTED BY PERMISSION OF THINK MAGAZINE. © 1958 BY IBM CORP.

LET US GIVE THANKS, TOO.

the Airman

OFFICIAL JOURNAL OF THE AIR FORCE

VOLUME II, NUMBER 10 NOVEMBER 1958

CONTENTS

Alaska
Our newest state holds a key position 4

Ignorance Can Kill You
Survival training in Alaska is a life and death matter 8

SAGE
Electronic key to modern air defense 11

Shim Has a New Life
U. S. servicemen are tough—except when kids are involved 15

Slants on Space
Facts about the new frontier 17

Needed: Safe Drivers
Special base training is producing them 18

Maintenance Minutemen
They launch a B-52 on a moment's notice 20

You Still Gotta Groom the Mounts
Airplanes need a lot of care 24

Not by a Single Bound (Concl.)
Preparing the orbiting man 26

In the Name of Congress
The enigma of Lt. Frank Luke 39

Either Conquer or Die
Saga of the USAF's oldest combat organization 41

Of Mice and Molds
Aids to scientific discovery 42

Guardian Angels of the Airways
Saving lives is the job of Air Rescue Service 44

DEPARTMENTS

Letters to the Editor ..... 2 **In My Opinion** 10

Airman's World 33

Director of Information Services
Office of the Secretary of the Air Force
MAJ. GEN. ARNO H. LUEHMAN

Chief, Internal Information
Office of Information Services
COL. ROBERT B. GOOD

Editor
LT. COL. HARMON H. HARPER

Assistant Editor
DAVE KARTEN

Executive Editor
CAPT. TED R. STURM

Art Director
SMS LESTER B. BOUNDS

Departmental Editor
M/SGT. HAROLD E. BAMFORD

Production and Distribution
RUSSELL M. WOODS

USAF PERIODICAL 30-15

SUBSCRIPTIONS

THE AIRMAN is available on subscription for $3.50 per year domestic, $4.75 foreign, 35¢ per copy, through the Superintendent of Documents, Government Printing Office, Washington 25, D. C. No back copies can be furnished.

Editorial Office: THE AIRMAN, Room 2-206 Tempo E, 4th and Adams Drive SW, Washington 25, D. C. Telephone: LIberty 5-6700, Ext. 67393.

THE AIRMAN is primarily a medium for the exchange of ideas and information among Air Force personnel. Readers are encouraged to submit articles, short subjects, photographs, and artwork. All contributions will be given consideration; suggestions and criticisms are welcomed. Opinions expressed by individual contributors do not necessarily reflect the official viewpoint of the Department of the Air Force. All photographs are official USAF photos unless otherwise designated.

Use of funds for printing this publication approved by the Secretary of the Air Force and the Director of the Bureau of the Budget July 5, 1956.

Cover: Rare photo of Convair F-102 firing **Falcons**.

WHAT IS QUALITY?

Sir: *In the August issue of* THE AIRMAN *you carried an article by General LeMay entitled* Be Professional. *(See page 24.) If the Air Force intends to promote the best qualified, will anyone in the so-called soft-core fields be considered for advancement? If we are to maintain the highest possible standards some effort will have to be made to promote airmen who have rendered superior service even though their careers have been confined to soft-core areas.*

A/1C Richard Crossley
Vincent AFB, Ariz.

Present and projected promotion policies are not confined solely to highly technical fields. (Hard-core, soft-core usage, incidentally, is passe. The definitions are now highly technical, technical, and semi-technical. These designations are based on length of training periods.) Quality is not dependent upon career field but rather the manner in which a person performs his job. Promotions are not, it is true, as abundant in the semi-technical and technical classifications, but best supporting evidence that no field is being overlooked is the recent promotion cycle to E-8 in which most career fields shared. Officials are doing everything possible to alleviate surpluses which are presently blocking many fields. The expanded retraining program amply demonstrates that every effort is being expended to assure equitable distribution of personnel throughout all job categories. Surpluses do not grow overnight and they are not corrected that rapidly, either.

★ ★ ★

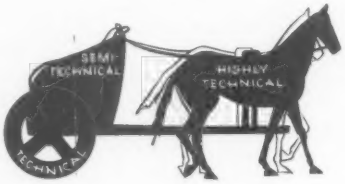
FROM OUTSIDE

Sir: *I recently left the Air Force, but my subscription to your fine magazine is still in effect. I have a couple of questions which are puzzling me and I was wondering if you could get the answers to them? First, does the Veterans Administration accept premiums for GI insurance in advance? Secondly, I am taking on-the-job training under the Korean GI Bill, and would like to know if there is any limit on my training wages?*

Name Withheld

With reference to your GI insurance question, the answer is yes. Not only are payments acceptable in advance, but you stand to save money by following this procedure. Premiums, paid on an annual, semiannual, or quarterly basis are discounted and, averaged out, amount to slightly reduced monthly payments. In answer to your second question, there is no limit on the amount you may earn. However, when your earnings plus your GI allowance exceed $310 a month, the Veterans Administration is obliged to scale down your training allowance to bring it within the ceiling established by law.

★ ★ ★



SURPLUS PROBLEMS

Sir: *In your June '58 issue you listed a group of AFSCs that are eligible for retraining. (See,* Retraining Revision, *page 22.) My AFSC 60173 was not included. Does this mean that it is no longer on the surplus list?*

T/Sgt. James Seagle
Stewart AFB, Tenn.

Because an AFSC is not included on the list of resource skills for purposes of retraining does not mean that it is not surplus. Some skills, while surplus, are still not eligible for retraining. According to the most recent information, AFSC 60173 is on the surplus list. For others wishing similar information, see Attachment 4 to AFR 39-8 which lists all surplus AFSCs. A corollary to this regulation is AFR 35-81 which lists the needed skills.

Sir: *I recently came back on active duty from a Reserve status. My present AFSC is 62250 and I wish to retrain. I have been told that I must serve at least a year in my present capacity before I become eligible. May I file a waiver for this period?*

A/1C Richard Grebel
Albany, Ga.

As long as you are on a second or subsequent enlistment and meet all other criteria, you are eligible to retrain. AFSC 62250 is a resource skill. Best advice would be to contact your parent personnel office to determine if you have all the other necessary prerequisites.

★ ★ ★

LANGUAGE RETRAINING

Sir: *I was born in Germany and speak, read, and write the language fluently. I also speak a little French and desire to learn the Russian language. I have been in the United States since 1952 and joined the Air Force shortly after coming to this country. At present I am overseas and my AFSC is 90651, but I would like to retrain into the language field. Can you give me any pertinent information as to procedure?*

A/1C, Name Withheld
APO

The language field is one of those which has a continuing need for specialists. AFSC 90651 is on the resource skill list, and training is open in Course AB 20330 (Language Specialist) for all grades from A/2C through S/Sgt. However, here some complications may arise. First, in order to apply for retraining, an overseas airman must be within nine months of his rotation date. Application should be made at least three months prior to reporting time for reassignment to a base within the Zone of Interior. One other factor also seems pertinent in your particular case. At completion of any language course, the graduate must be eligible for overseas. For specifics in all cases such as this,

the best advice is to go directly to your own personnel officer. General information is contained in paragraph 8, AFR 53-11.

★ ★ ★

WE FOUND THE WAF, BUT . . .

Sir: *Thanks, thanks, and more thanks for a wonderful story about females in the Air force. (See,* Cherchez la WAF, *August '58 issue.) From past personal experiences I try to answer all the many questions that I am asked about our organization. Your article supplies the answers to all the many others that come up from time to time.*

A/2C Jane Bunker
Sheppard AFB, Tex.

★ ★ ★

WE ALSO GOT IN TROUBLE

Sir: *Reference is made to your article about the WAF. It was enjoyable and informative; however, the last paragraph contains a statement that is very disturbing to me. The sentence in question reads, in part, "and if you are of the Christian D. school there is always a spare parachute laying around." Supply discipline hardly condones this type of operation.*

Col. George S. Roberts
Chanute AFB, Ill.

The author, of course, intended only to chide the sack and chemise styles. The possibility that it might be construed as a jibe against supply practices was overlooked by THE AIRMAN staff and coordinating agencies. No one in the Air Force sanctions the misuse of government property.

★ ★ ★

TEACHING CAREER

Sir: *I have, for some time, been contemplating the course to follow upon retirement. After reading* New Career for "Old" Airmen *(July '58 issue), I have been given a new slant and sufficient material to get started along the road to a post-career career. However, I do have a question. Why not make present veterans educational benefits available to retired personnel beyond the 1963 cutoff date?*

M/Sgt. Anthony Buono
Eglin AFB, Fla.

The Veterans Readjustment Assistance Act of 1952, often referred to as the Korean G. I. Bill, states that education, provided under that act, must begin not later than three years after discharge or release from active service. If the veteran's date of discharge or release was on or before January 31, 1955, his training must be completed not later than January 31, 1963. If his discharge date is after the 1955 date, his training must be completed before the eighth anniversary of that discharge or by January 31, 1965, whichever is the earlier date. Best recommendation is that persons desiring to further their education after release from active duty should begin now by participating in the education services program at their present station. Guidance may be obtained from the education services officer.

★ ★ ★

MISSION-TYPE DUTY

Sir: *Could you please tell me if there is any demand for supply personnel for Air Force mission duty? If the answer is yes, is there any standard waiting period between application and assignment?*

T/Sgt. Billy Riddick
McCoy AFB, Fla.

USAF operates missions only in South America. All other duty assignments of this nature, such as MAAG, SHAPE, and NATO, are referred to as "mission-type' duties. There is a limited demand for supply personnel, and application may be made under provisions outlined in the revised AFM 35-11, published in June. Officials in Selected Assignments Branch, DCS/Personnel, Hq USAF, indicate there have been several other policy changes with relation to these assignments. For example, while assignments are made as nearly as possible to conform to applicant desires, the privilege of refusing an unwanted area was withdrawn on September 1. It is virtually impossible to predict the length of waiting period. However, once the application is received, the applicant is immediately notified by mail. In the past, applications were no longer valid after a year on file. This period may now be extended if the applicant desires. Local personnel officers can assist on details.

GETTING THE AIRMAN

Shortly after the October issue went to press with information on *How You Get the Airman* (page 1), we received some changes from the Superintendent of Documents.

The subscription picture now looks like this: $3.50 per year for domestic subscriptions; $3.50 per year, plus $1.25 for foreign subscriptions; and $.35 per single copy, both foreign and domestic. It should be noted that the Superintendent of Documents cannot furnish back issues.

To reiterate October's message, THE AIRMAN is printed for everyone in the Air Force, regardless of grade. It is distributed free to all active Air Force units, Air Reserve Centers, and Air National Guard organizations. Although members of these organizations receive THE AIRMAN free, each copy must serve 10 readers. Therefore, if you want a personal copy, you can purchase a subscription for a one- to three-year period. Make all checks or money orders payable to Treasurer of the United States. Wouldn't THE AIRMAN be a nice Christmas gift for your family?

Superintendent of Documents
U. S. Government Printing Office
Washington 25, D. C.

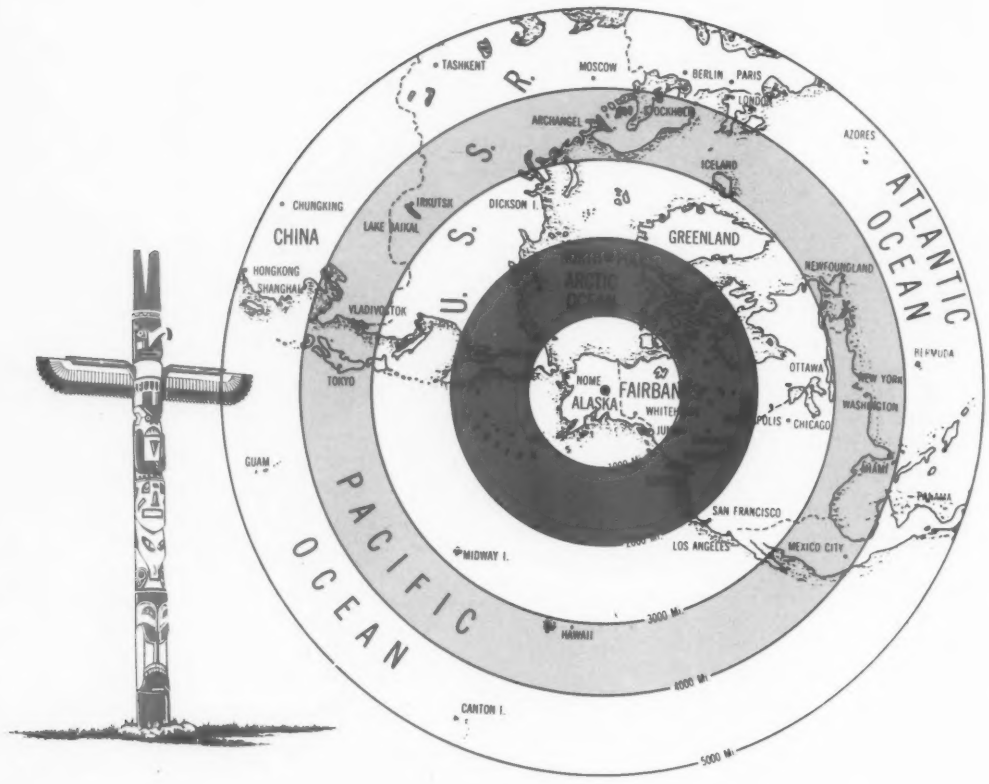
Please send THE AIRMAN for____ year(s) to the following address. Enclosed is a check or money order for

$_____.

Name_____

Address_____

City_____ State_____



ALASKA

THE oldest joint military command established by the U. S. Chiefs of Staff stands guard over the most direct approach to the strategic targets of North America. Thus upon the Alaskan Command may well depend the survival of democracy in the world, and the preservation of the political integrity of the United States.

Alaska's strategic position in the world today epitomizes a new era in military thinking ushered in when the Alaskan Command was created on January 1, 1947. The relatively clear distinction between the centuries-old role of land and sea forces disappeared in the wave of spectacular advances in military technology which began some 20 years ago. Armies and navies, although traditionally recognized as complementary to each other, were divisible one from the other—and unique unto themselves—until the addition of airpower in World War II demonstrated that global military operations require joint, coordinated efforts by all available instruments of force.

Airpower, in effect, while accruing to itself a power of decision transcending and overlapping the existing capabilities of land and sea forces, established the inadequacy of mere complementary effort, and proved the necessity for interlocking action, regardless of which branch of service was placed in position to execute the *coup de main.*

Because Alaska is recognized primarily as a theater of air operations, the commander in chief has continuously been an Air Force officer since shortly after activation of the air arm as an autonomous branch of service. Gen. Nathan F. Twining, a lieutenant general at the time, became Commander in Chief, Alaska, on July 1, 1947. The present commander in chief is Lt. Gen. Frank A. Armstrong, Jr., who distinguished himself as a bomber wing commander in both the Pacific and European theaters during World War II.

The airpower component of the joint command is the Alaskan Air Command, under Brig. Gen. Conrad F. Necrason with headquarters at Elmendorf Air Force Base near Anchorage.

U. S. Army, Alaska, with headquarters at Fort Richardson a short distance from Elmendorf, operates the most

important port facility in Alaska, and provides a gigantic volume of essential engineer services. It also maintains regimental combat teams—streamlined, highly mobile units especially trained for operation in northern latitudes. Antiaircraft units equipped with modern weapons surround numbers of sensitive areas.

The naval component of the Alaskan Command is designated Alaskan Sea Frontier. From its headquarters at Kodiak in the Gulf of Alaska, the Navy guards the sea lanes leading from the west coast of the United States to the polar icepack. It also operates a highly essential seaborne logistical support program.

These three components, unified at the top echelon, work harmoniously to accomplish the Alaskan Command's three-pronged mission: to furnish early warning of aerial aggression aimed at the North American continent; to provide air defense for Alaska and the Arctic approaches to the continental land mass; and to provide a platform for retaliatory action.

Area and Operations

To facilitate control over the dozens of subordinate organizations, the Alaskan Air Command is divided by an arbitrary line running east and west roughly parallel with the Alaska Range, a 150-mile-wide chain of mountains to the north of Anchorage.

The 10th Air Division (Defense) maintains jurisdiction over the southern sector—most thickly populated portion of Alaska—and over the Aleutian Islands. The distance from Attu, outermost island of the chain, to the Russian submarine base at Petropavlovsk in the Soviet Republic of Kazakh is less than 800 miles.

notes on its strategic significance

by T/Sgt. John K. O'Doherty
Airman Staff

From its headquarters at Ladd Air Force Base near Fairbanks, the 11th Air Division (Defence) carries out the functions of the command north of the Alaska Range to the icepack surrounding the North Pole. Its sphere of influence is bounded on the east by Canada's Yukon Territory, and on the west by the International Date Line. Well over half the Alaskan mainland, including the basin of the Yukon River, the Brooks Range of mountains extending from Canada to the west coast, and the endless tundra wastes of the Arctic slope, fall within the geographic area covered by the 11th Air Division.

In carrying out the mission of providing early warning to the United States in the event of surprise attack, the Alaskan Air Command depends on three separate but closely coordinated agencies: the Dew line (Distant Early Warning) system stretching for 3,000 miles across the continent from Baffin Island on the Atlantic side of Canada; a chain of AC&W sites on Alaska's west coast, and the communications network known as White Alice.

Construction is now in progress on additional Dew line stations along the Aleutian island chain to extend into the Pacific the existing western sites guarding Alaska's Arctic sea coast. When it is completed this stretch-out system will connect with the wall of radar maintained by the RC-121 *Super Constellations* on constant Pacific patrol from ariborne early warning and control squadrons based at McCellan AFB, Calif.

Face to face with Russian Siberia, the second of the three agencies—the AC&W sites stretched from Cape Lisburne in the north to King Salmon on the Alaska Peninsula—provides radar protection along a rugged, indented shoreline. Some of these sites are situated on islands, others are conveniently located adjacent to Eskimo or Indian villages like Kotzebue or Unalakleet. Many have nothing to distinguish them from the surrounding wilderness save their coordinates on the map.

With the additional network of AC&W sites scattered throughout the interior of the territory, the two AC&W groups serving the Alaskan Air Command provide complete surveillance radar coverage to the south and west of the Dew line, as well as airborne control for combat aircraft defending Alaska, the United States, and Canada.

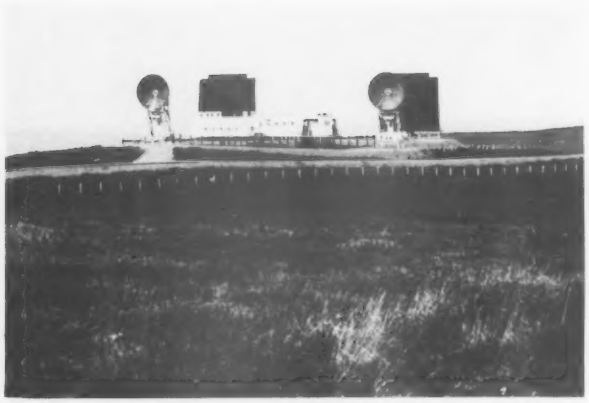
Third component of Alaska's elaborate fire-alarm system is the White Alice communications network designed to provide 3,100 route miles of voice and telegraph channels covering the length and breadth of the mainland. White Alice is made up of 33 radio transmitting and receiving stations situated about 200 miles apart and employing over-the-horizon transmission techniques never before used on so large a scale.

Scoop-shaped, 60-foot antennae, resembling the screen of a drive-in movie, broadcast ultra high frequency signals

in the fanlike pattern of a searchlight beam. A portion of the signal is bounced off the troposphere, a layer of atmosphere about five miles above the earth, and is picked up by the receiver some 200 miles distant. The network is a civilian-operated system built under Air Force contract. Dew line and AC&W sites are tied together by White Alice which connects with the AAC combat control center at Elmendorf Air Force Base. From command headquarters direct lines lead to North American Air Defense Command at Colorado Springs. In addition to its role in the early warning network, White Alice supplies communications service to the Army, the Navy, Civil Aeronautics Administration, and numbers of civilian communities heretofore completely isolated from the rest of the world.

Missile detection facilities, now programmed for activation in Alaska, will round out the protective radar screen to make it as complete and effective as possible.

For the air defense of Alaska and its approaches, the Alaskan Air Command employs F-102 *Delta Dagger*



A White Alice installation. This fantastic communication network is a modern miracle.

Alert hangars at Elmendorf AFB, near Anchorage, keep the F-102s ready to roll at a moment's notice.

interceptors based at Elmendorf AFB, and the F-89J operating from Ladd. *Falcon* guided air missiles which are carried by AAC interceptors were originally designed for use in Arctic regions, away from centers of population. The electronic intelligence of the missile will hold it on course to the target in spite of any evasive maneuvers an enemy may undertake.

Military History

Although the Army and Navy were both actively concerned with Alaskan affairs in the early days following purchase of the territory from Russia, it was not until the period of World War II that this vast expanse of more than half a million square miles assumed any real military significance. Generations of map-makers—conveniently dividing the world into two neat slices with north at the top and south at the bottom—traditionally depicted Alaska as a snow-covered, somewhat vague area in the upper left-hand corner of the New World, completely isolated—it would appear—from the habitable, more hospitable countries of the earth. In point of fact, Alaska's climate—particularly in the Anchorage area—is less severe than that of many of the states along Canada's southern border.

Yet from the beginning, military observers agreed that the geography, climate, and topography rendered the territory unsuitable for large scale surface operations. As late as 1937, military forces assigned to Alaska consisted of 12 officers and 286 enlisted men garrisoned at Chilkoot Barracks, plus a few detachments of the Army Signal Corps stationed at key areas to service and maintain communications facilities.

With the evolution of airpower, and recognition of strategic possibilities embodied in three-dimensional operations, the military implications of Alaska's position on the globe emerged in a new light. It is true that Japan's invasion of the Aleutian Islands off the coast of Alaska in 1942 had little or no value when measured by the classical yardsticks of conventional warfare, but it pointed up dramatically the significance of the area in terms of strategic air operations.

Cape Prince of Wales on Alaska's Seward Peninsula is separated from the Chukotski Peninsula in Russian Siberia only by the 50-odd miles of the Bering Strait. The shortest air routes from Europe to the Orient lie across Alaska. A direct air lane from the central United States to India, or from the western United States to Moscow, would cross over the rugged territory once known as Seward's Folly. In 1946, two years prior to the overthrow of the Knomintang government by the Communists, agreements were enacted with China for commercial air traffic between the west coast of the United States and cities on the Chinese mainland, with routes following a path over Alaska.

As a base from which to launch defensive action against aggression, Alaska offers unique characteristics to recommend it. Virtually the entire area of the Eurasian continent is within range of 5,000-mile weapons which might be based in Alaska. (See map p. 4.)

The distance from Fairbanks in central Alaska to Vladivostok, Russia's principal port on the Pacific and terminus of the trans-Siberian railroad, is less than that from Fairbanks to the Panama Canal and an extension of the same route would lead to Shanghai, the area of Hongkong, and the inland cities on the Chinese mainland. Every

B. Gen. C. F. Necrason is commander of Alaskan Air Command.

Armament crews prepare to load *Falcons* on an F-102.

nation or combination of nations capable of waging modern warfare on a significant scale lies between the 30th and 65th parallels of latitude in the northern hemisphere—and can be covered by a field of fire from the area.

By the same token, vital targets in the United States are well within reach of Soviet strategic weapons following the route over the Arctic region and across Alaska or Canada. The airfields at Anadyr and Markovo on Siberia's Chukotski Peninsula lie almost due west of Nome, and from Markovo to Anchorage is an easy flight of roughly 1,200 miles. Strategic weapons with a range of 5,000 miles launched from Markovo could reach any target in the United States or Canada, including the east coast down to the southernmost tip of Florida. From almost any point along 3,000 miles of Russia's Arctic coast long-range weapons could reach deep into the United States by following the route over the pole.

The Arctic region is of such critical sensitivity that the United States proposed to the United Nations Security Council in April 1958 that this be the first part of the world subjected to aerial and ground inspection in the program for disarmament. The proposal was vetoed by the Soviet delegate on May 2, 1958.

Twenty-six miles south of Fairbanks, the Alaskan Air Command maintains Eielson Air Force Base, a completely modern installation with 15,000-foot runways for the accommodation of SAC bombers. The area of Eielson enjoys the best flying weather in the territory—winter or summer—and SAC crews receive training in cold-weather operation on tours of temporary duty. These training flights are supported by a squadron of KC-97 aerial tankers located at Elmendorf AFB. Thus Alaska serves as a platform for retaliatory action.

And underlying the daily operations of the Alaskan Command, is the knowledge that in the event of an attack over the Arctic, AAC interceptors will be the first to make contact with the enemy. Their success in blunting the edge of the attack could exercise an important influence on the time and national effort required for ultimate victory.

It is apparent that Alaska's strategic position in deterrent defensive operations is vital to North American security.

AN OPEN LETTER TO AIR FORCE PARENTS

My Dear Mr. and Mrs. U. S. Air Force:

For many years now, I have been faced with the serious problem of answering many, many letters sent to me by children from all over the world. As you may well imagine my secretarial staff must remain small so that the larger portion of my annual budget can be allotted to the construction of toys.

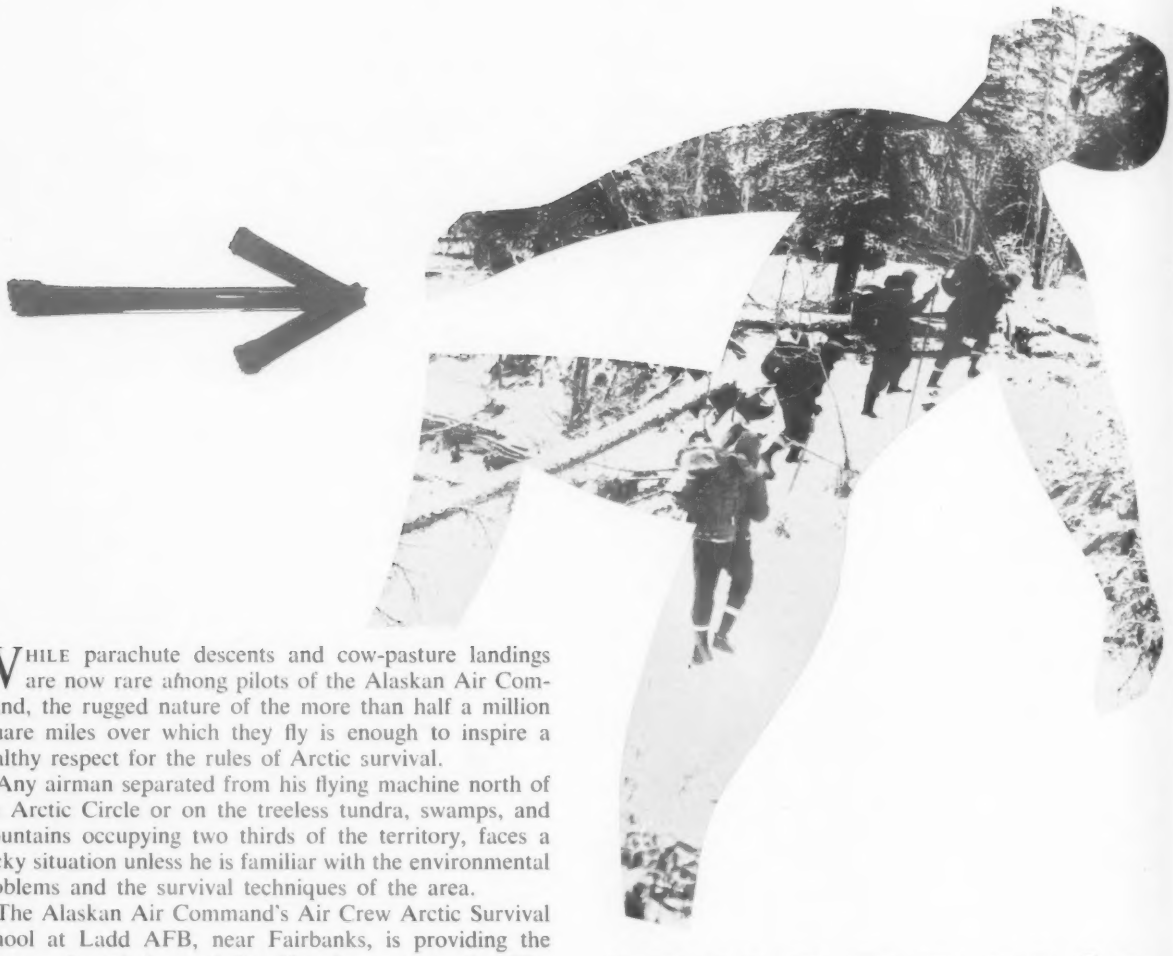
This, dear parents, is where you come in. Through my close and jolly association with the fine Air Force people stationed throughout my Arctic domain, I have learned that you people are second only to me in your love for children. In fact, the commander of the 55th Weather Reconnaissance Squadron at Ladd AFB, Alaska (a man with warmth and tenderness in his heart for fledglings) has agreed to work with you in bringing an added Christmas joy to your children.

All you do is write a letter to your own child and by special dispensation, affix my signature. Place the letter in an envelope addressed to your youngster and stamped with airmail postage. Then place the letter in a larger envelope addressed to: Santa's Mail Bag, c o Detachment 1, 55th Weather Reconnaissance Squadron, APO 731, Seattle, Washington.

Detachment 1 of the 55th operates a post office at Santa Claus House, North Pole. The airmen there will mail the letter from me. But remember! Your letters must be mailed in the ZI by December 15. Soon after that, I'll be busy wrapping presents.

Sincerely yours for a Merry Christmas,

SANTA CLAUS



IGNORANCE

WHILE parachute descents and cow-pasture landings are now rare among pilots of the Alaskan Air Command, the rugged nature of the more than half a million square miles over which they fly is enough to inspire a healthy respect for the rules of Arctic survival.

Any airman separated from his flying machine north of the Arctic Circle or on the treeless tundra, swamps, and mountains occupying two thirds of the territory, faces a sticky situation unless he is familiar with the environmental problems and the survival techniques of the area.

The Alaskan Air Command's Air Crew Arctic Survival School at Ladd AFB, near Fairbanks, is providing the necessary knowledge, and dispelling dangerous myths. The school, established originally at Nome in 1947, moved to Ladd about three years later to follow the trend of military population.

Since its inception a little over 10 years ago, the school has trained 9,000 students including rated personnel who are expected to attend as soon as practicable after assignment to the theater, and military-connected civilians from a variety of scientific and industrial fields.

In November, when the cold and darkness of winter have set in for the season, school operation gets under way. It continues through March. Each student spends a week at the school. Classes, which number from 25 to 60 persons, are broken down into units of about six men under the guidance of an instructor.

With little fanfare, the students plunge into absorbing study kicked off by a series of lectures designed to prepare students for the chillingly realistic experience of living under Arctic survival conditions.

The variable geography and climate of Alaska complicate the school's job, because any one of a number of situations might be encountered in an emergency. In the southwestern area, well covered by coniferous forest, relatively moderate temperatures prevail, while the interior experiences extended periods with 50 degrees below zero registered on thermometers. To the north, the flatland tundra, an inhospitable region which supports only hardy mosses and stunted shrubs in summer, extends to the Arctic Ocean. Beyond the coastline stretches the Arctic icepack covering the waters surrounding the North Pole.

After the lessons in geography instructors discuss the importance of survival equipment and the psychological reactions of a man in a survival situation.

The seven main enemies of survival in any part of the world are pain, cold, thirst, hunger, fatigue, boredom, and loneliness. Their danger, taken either singly or in combination, is further enhanced by fear—inevitably present in any survival situation. Those who can accept fear as normal under the circumstances have taken the first step toward survival, for fear can inspire some men to accomplishments in excess of their normal capabilities; for others, it can mean paralysis and absence from the roll call of survivors.

To illustrate how fear in combination with pain can

bring about disaster, instructors often relate this story from an actual case:

"His parachute caught in the tree, and he found himself suspended about five feet above the ground. . . . One leg strap was released while he balanced in this aerial position and he immediately slipped toward the ground. In doing so, his left leg caught in the webbing and he was suspended by one leg with his head down. Unfortunately, the pilot's head touched an ant hill and biting ants immediately swarmed over him. Apparently in desperation, the flier pulled his gun and fired five shots into the webbing holding his foot. When he did not succeed in breaking the harness by shooting at it, he placed the last shot in his head and took his life."

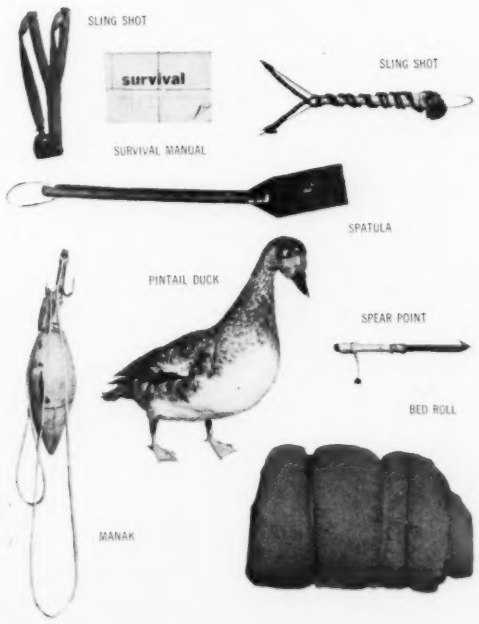
Good absorption of training, confidence in equipment provided, high morale, and some knowledge of rescue procedures in the area are important factors in minimizing the disastrous effects of fear. No weapon has yet been found to combat the seven enemies of survival more effectively than adequate survival training.

The early pioneers who rushed to Alaska with somewhat haphazard equipment combatted the cold by having their sled dogs sleep across their feet or legs. It is not uncommon even today to hear an oldtimer describe the weather as a "two-dog night," or a "four-dog night."

Trying It Out

After the theory, students at the Arctic Survival School move out to an encampment area several miles from the base. There they practice what the instructors preach. For two and a half days they live under survival conditions. Each man, with the regular issue of Arctic clothing and the SA-5 (Survival Arctic) ration, is permitted to take the ordinary items such as cigarette lighters and chewing gum which he might normally carry in his pockets.

CAN KILL YOU

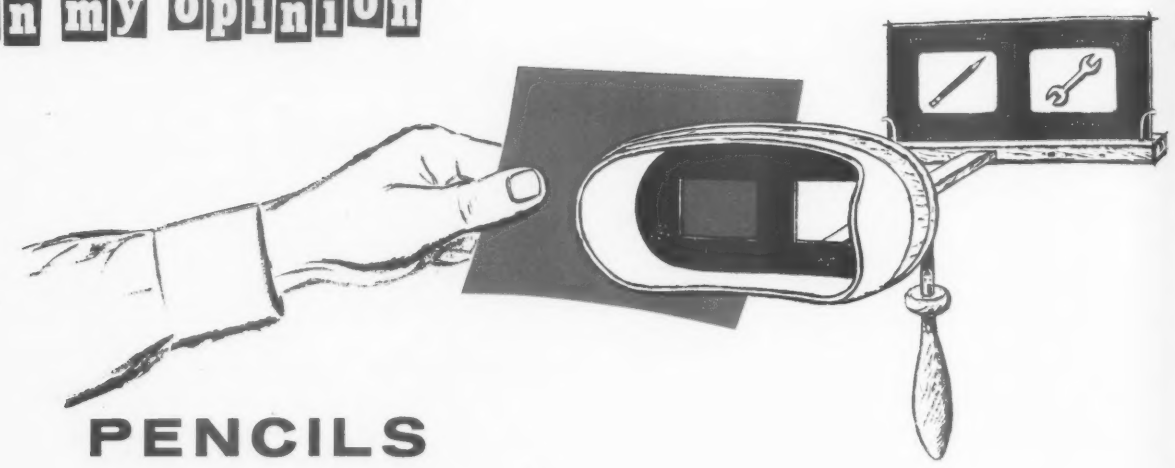


No matter how thorough the classroom instruction, there are always new lessons to be learned in the field. Many a student has built a neat fire using the proper types of wood and in exact accordance with the book only to watch in dismay as his blazing creation slowly sinks beneath the snow.

Shelter-building and fire-making occupy considerable time on the first day, but after that students are required to devise traps and snares from material found on the scene, and to demonstrate the use of flares, mirrors, and other methods of communicating with "rescuers."

An airman may face so many possible situations in the north that the school cannot supply a sure-fire solution for each. But the fund of knowledge proves its usefulness in the increased confidence with which graduates face the hazards and inconveniences of life in the Arctic. Knowledge and confidence destroy ignorance and in the north country this can spell the difference between life and death.

in my opinion



PENCILS & WRENCHES

by T/Sgt. William H. Foster
Lincoln AFB, Nebr.

ONCE upon a time there were three boys who were the best of friends. They were doing a pretty good business shining shoes. Two shined while the other steered prospective customers to them. After a while people automatically came to believe the two "shiners" were the ones solely responsible for getting the job done—even though the other boy still carried on his end of the business. This is the point I am led to believe by reading THE AIRMAN, *AF Times, Reenlistment Posters,* etc., that the poor *soft core* man is considered secondary. I made it a point to research numerous articles pertaining to the glories and prestige of an Air Force career. Ninety-nine percent of those glorified are the so-called *hard core* men. I know (especially in SAC) the *hard core* man is most sought after. It's only logical. He is the actual *mission man.* But . . . your posters, magazines, and other publicity media do not depict the poor finance man who continuously works overtime to keep your pay straight; the statistical or analysis man who spends many hours compiling figures to show where it would be easier to add this and delete that to make your job easier; the perpetual AP who patrols the flight line in +120 degree and —20 degree weather for 8 to 12 hours at a time, and don't forget those "slaw slingers" over in the "ptomaine tavern." How many times have you said, "Jeeze sarg, I'll miss chow if we do that," or "Let's make it back to the base and eat, then we will still have time to pick them up at 1930." Don't forget the pill rollers—the guys that gave you a couple of shots for Asiatic flu and polio, or removed that speck from your eye so you could really feast your eyes on that gorgeous babe you met last night. Let's not forget the clerk who is told at 1630 on Friday, "You will probably have to work all weekend on that report, because it's due out on the 3rd and the 3rd is Monday." Let's face it. The *soft core* man is not being given full credit or publicity.

When I go on leave they ask "What are you, jet mechanic, radioman, boom operator, engineer?" I tell them no, I work in statistical services. "In staaa, stati. . . . You are in what?" "You mean you never heard of stat services? We compile figures for various reports . . . audit reports, control them. We deal a lot in the final product. You know, it's like being the last man on the assembly line in certain instances." "Heck no. I knew there were a couple of cooks, APs, a supply sergeant, but never a, ah, ah stat man?"

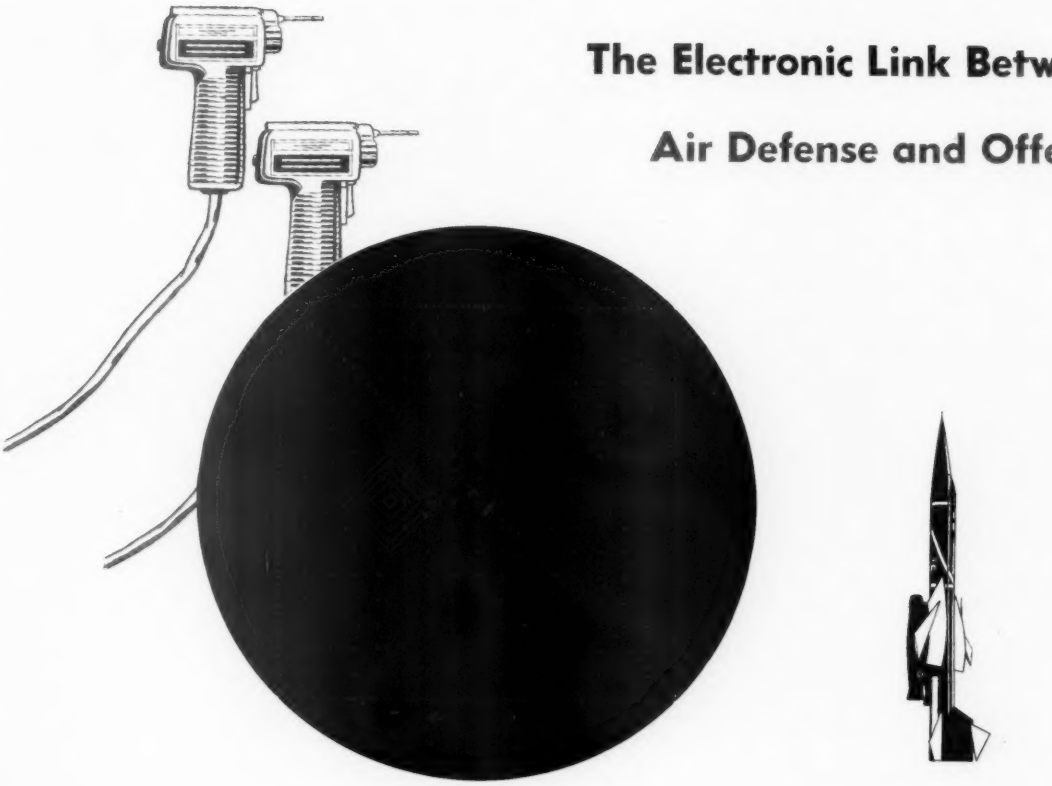
I was really surprised to see in the June '58 AIRMAN an article about the first shirt. Maybe the Air Force still has use for the *soft core* men after all.

Actually, *hard core* and *soft core* don't define the subject at all. Maybe only to the military man, or maybe to a few civilian employees concerned with manning. I believe *primary mission* and *support mission* better suit the designation.

Editor's Note: *Nobody can deny that Sergeant Foster has a point. The designations,* hard core *and* soft core *have been replaced with* Direct Support Skills *and* Indirect Support Skills, *respectively, which come fairly close to the sergeant's recommendation.*

In our *opinion, however, lack of publicity relating to Indirect Support Skills doesn't stem from censorship, by any means. It's a sad fact of life that ball carriers get more raves than blockers. For the Air Force, publicity is usually a subtle form of advertising, and as the shortage of* Direct Support Skills *has been greater than that in the* Indirect Support Skills, *more emphasis has been placed upon acquiring and retaining people with the former qualifications. As for the relative importance—well, a short pay check probably causes as much commotion as an increase in AOCP rates.*

The Electronic Link Between Air Defense and Offense



SAGE

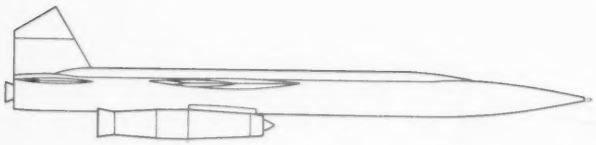
by Lt. Col. Harmon H. Harper

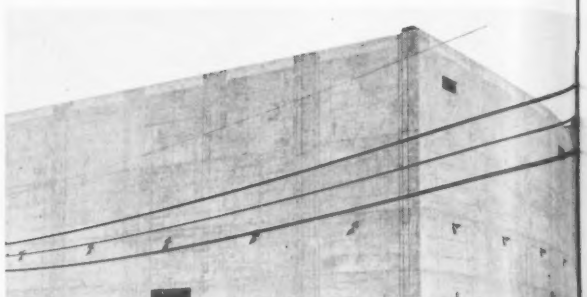
"The ultimate in air defense would be to destroy the enemy forces before they got off the ground. The next best air defense is to attack the enemy forces immediately after they have been launched or at least as far from the target area as possible. The least desirable and last ditch stand air defense is to attack the enemy when he is at or near his target area."—GEN. CURTIS LEMAY

ON September 24, an Air Force officer pushed a button at Kingston, N. Y. In the electronic twinkling of an eye, a mighty *Bomarc* missile 1,500 miles away in Florida roared skyward.

As the IM-99 sped aloft under ground control, its myriad parts meshed smoothly and its electronic brain computed information furnished by the Eastern Air Defense Direction Center in Kingston. Minutes after launching, the 99's ramjet engines cut in boosting its flight to 2,000 m.p.h. Now the target was in range, traveling at 1,000 m.p.h. and 48,000 feet altitude. Ground control was discontinued and the *Bomarc's* electronic mind and self-contained target system took complete and certain control. Within minutes after firing, the IM-99 figuratively blasted the invader from the skies a hundred miles from our coast.

This was a programmed experiment to test the compatibility of the Air Force SAGE system and the *Bomarc* area-defense missile. This experiment simulated a mock supersonic missile attack using the North American X-10 research vehicle which is capable of Mach 2 speeds.





The SAGE Direction Center of the New York Defense Sector at McGuire AFB houses an array of complex equipment including two high-speed electronic computers, many TV-like display consoles, and other electronic wonders that help make up the Semi-Automatic Ground Environment system.

The What and Why of Sage

To the cook, sage is a mandatory seasoning for the holiday turkey; to the cowboy it is a purple shrub on western plains; and to the philosopher it is the wise man with a view of the future. To the American citizen it is all of these plus added protection from air attack.

SAGE, in the latter sense, is a Semi-Automatic Ground Environment system using digital computers to analyze flight information received from many sources, detecting suspicious flights, and generating battle orders that could send interceptors, missiles, and bombers into action. This final decision, however, is reserved by and for man.

To understand this system, its need, and contribution to air defense, we must first understand a concept. Our National policy is based on the principle that we will not initiate an offensive war. The enemy will strike first. In order to survive in this supersonic, hydrogen-bomb age we must have several things.

First, we must have a weapon system capable of repulsing him on his initial attack as far from our shores as possible. Second, we must have a weapon system to destroy the enemy instantly at his bases when he attacks. This is the only way that a flow of destructive weapons can be eliminated. This means we must have a coordinated air defense and offense system capable of instant action. A system with these capabilities not only provides greater defense but greater deterrence to aggressive war. It is an historic principle that no nation aggressively attacks another unless it has reasons to believe it can subjugate the other. The principal deterrent is the potential victim's capability and determination to impose equal or greater destruction on the aggressor. Today, that must be done instantly.

The Need for SAGE

Each day there are more than 30,000 scheduled flights in the United States. There are many others which are not scheduled. In addition, over 600 flights enter our skies from other areas and from all directions.

A single modern military plane is capable of carrying a bomb load with a greater destructive capacity than all the bombs dropped in World War II. Unfortunately, military aircraft and subsonic guided missiles look no different on a radar scope than many of our commercial planes. Self-preservation dictates that we have a system that can quickly analyze these flights, compare them with known and predicted flight plans, and tell us which are suspect. At the same time this system should be capable of providing information on which the air offensive and defensive weapons of all categories can be employed most effectively and instantaneously. SAGE is capable of all these activities.

The SAGE Library

SAGE receives the same information that our air defense system has received before. Positions and tracks, i.e. routes that planes take, are fed into SAGE's memory drums by heavy surveillance radars within the United States. These radars could detect an aircraft, say 100 miles away in about 1/1,000 of a second. Height-finder radars give the altitude and small "gap-filler" radars plug the holes between the large radars.

Three radar networks to the north extend our warning time and their information is fed into SAGE's library. The Pinetree line overlaps Canada; the mid-Canada line stretches from British Columbia to Newfoundland and the Dew (Distant Early Warning) line extends across Alaska and Canada. The latter line is being extended into the Aleutians. Additional radars in Alaska also provide information.

Beyond the continental limits, our warning is extended sky and seaward by constantly patrolling airborne early warning aircraft—RC-121 *Super Constellations*—which are flying radar stations. Out on the continental shelf of the Atlantic, Texas towers with their long-range radars furnish more information. Navy picket ships operate further off-shore to furnish additional warning time and information.

Civilian and military flight plans are relayed to SAGE by the Civil Aeronautics Administration (soon to be absorbed by the Federal Aviation Agency) and military flight centers. Weather information is provided by the Air Weather Service. This completes the information that goes into SAGE's library.

Under the old system all this information had to be processed manually. Personnel plotted the courses of detected flights, read radar scopes, and received information from other sources. Each intercept control station could process information from only one or two radars. A SAGE center can link as many as a dozen radars together automatically, process the information in microseconds, transmit it from sector to sector, and present a more comprehensive picture of the air situation over a larger area with greater speed, accuracy, and reliability. It can handle the detection-identification-interception phases of air defense and display, electronically, to the commander, the several order-of-battle alternatives available to him.

In the Blue Lighted Room

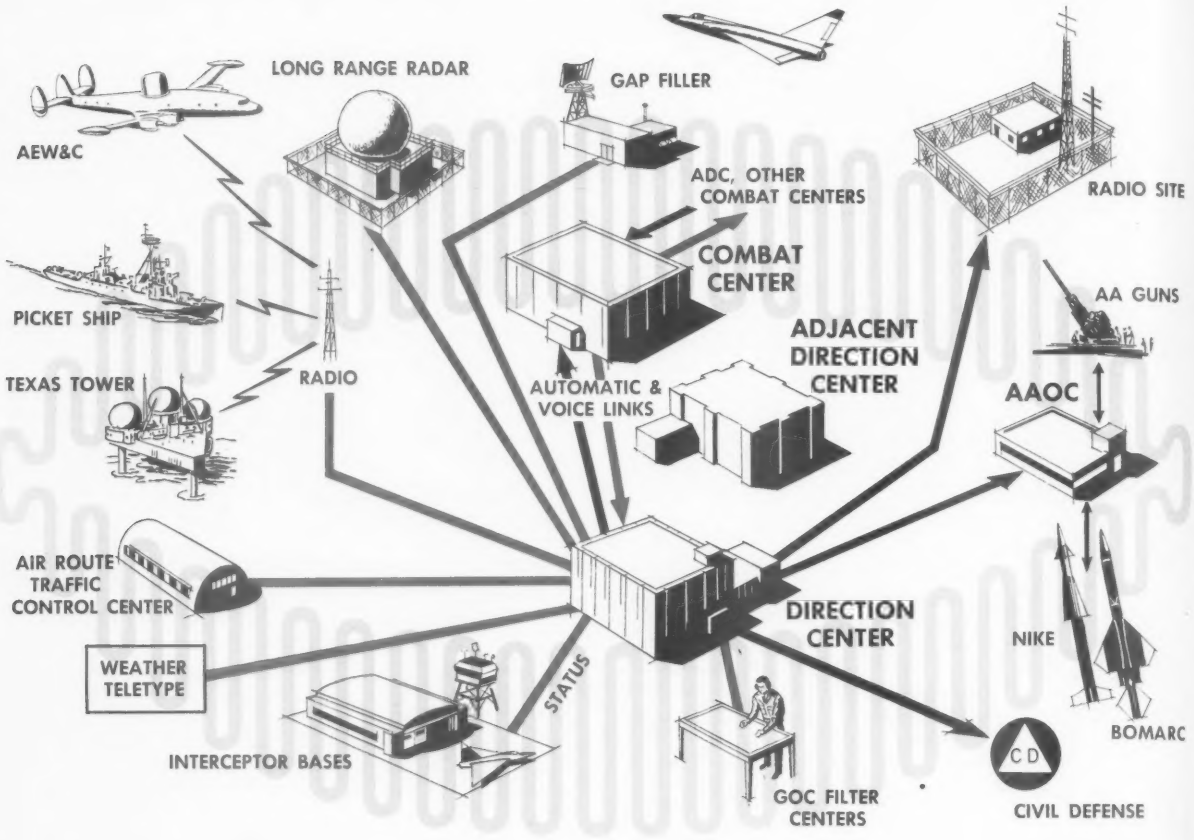
A sector commander sits in the center of a two-story-high pit, sound conditioned and blue-lighted. Directly in front of him and his key staff officers is a large projection screen upon which is flashed an enlarged, overall picture of the air situation in his sector. Upon many display tubes of a TV-like console, appear letters, numbers, words, geographical outlines of the area under surveillance, and radar returns. With the push of a button the commander can display the air battle situation in his or a combination of areas.

When all the programmed SAGE direction centers are completed, they will display the situation existing over the entire United States. Air commanders in SAC and TAC as well as NORAD and ADC will be able to watch the developing situation and coordinate their actions.

Operators working in three shifts around the clock sit before the consoles watching the tubes blink on and off displaying the latest data in their area of responsibility. From another room, the computer feeds specific information to each console. By pointing a Buck-Rogers-type electronic gun at the display tube, an operator can obtain or introduce additional information on his sector from

The display console presents a picture of the air defense situation within its assigned geographic area. Using the buttons and switches on the console, the operator can request such information as speed, altitude, and weapons availability and location to be displayed and can direct action to be taken against an attacker. With the light gun, the operator assigns identifying numbers to the aircraft radar tracks on the display.

Photo courtesy IBM



the computer. The computer will accept and store the new information for future use. If it conflicts with that already received or if the operator has made a mistake in pushing his buttons, a light flashes and a bell rings. This is a signal for the operator to recheck his information or digital dexterity.

If fighter interceptors have been airborne, the computer displays for the pilot much of the same information it shows the sector commander. The computer can also control the plane through its automatic pilot and vector it to the proper position for interception.

The computer also calculates for the operator, the most effective employment of guided missiles, anti-aircraft batteries, and planes. The responsible commander, however, decides the weapons, or combinations, and the time for their use. Nevertheless, SAGE can check his decision for human error. Suppose a weapons director decided to commit a *Bomarc* to attack a target before intercept was possible. The computer would automatically arrive at a "no" answer and sound an alarm calling attention to the human error.

The Physical SAGE

A typical SAGE direction center covers two acres and is housed in a windowless, four-story building of blast-resistant concrete. The outside walls are six-feet thick and interior partitioning walls are a foot thick. The electrical power required for a SAGE direction center is sufficient for a community of 15,000 people. Four diesel generators, two operating and two on stand-by or in maintenance, are installed.

Eighty-five maintenance men using 99 volumes of operational and maintenance instructions keep the direction center operating 24 hours a day. A special maintenance control room monitors the actions of the computers and the electronic equipment. By referring to a schematic panel or by monitoring a panel of flashing lights, maintenance men are able to instantly detect any trouble that might develop. Maintenance men are able to forecast the failure of a component before it happens by comparing required voltages with those being registered.

Step-by-step automatic telephone dial systems, intricate key arrangements, and a two-position manual switchboard are installed. The entire system requires 320,000 connections and 3,000,000 feet of cross connecting wiring. This is sufficient to serve a city of 40,000 people.

Two computers, one operating and one on stand-by, receive the information from direction centers. They handle programs dealing with nearly a quarter of a million orders or instructions. Each computer weighs 275 tons and occupies space equal to the total floor space of 24 average ranch-style homes.

Although these figures are impressive the capabilities of the system itself are more so. By teaming our various weapon systems with SAGE's electronic ability, we obtain a more effective coordinated air defense-offense capability. Gen. LeMay stated, "In my opinion, SAGE represents the largest single step toward the improvement of the air defense capabilities of this country in the past 10 years."

IN
THE NAME
OF HUMANITY

Shim has a New Life

by Capt. John W. Keeler
Luke AFB, Ariz.

He doesn't remember much of what happened that day. He was only four. There was a lot of noise, mainly gunfire. Big tanks rolled through the street past his house. Then it became quieter as the gunfire went further away. Some men came into the house. They carried rifles with bayonets. He was taken outside with his father and mother.

"And then they shot us."

That's the way Johnny Booth tells about that day in July 1950 when the North Korean army came through his city of Inchon just south of the 38th Parallel.

Today Johnny is the legally adopted son of Technical Sergeant John Booth of Luke Air Force Base. But that's a long story. Here's how Johnny and Sergeant Booth tell it.

Johnny's Korean name was Shim Kwan Soo. He was born September 14, 1946. His father was an electrician with the Inchon Electrical Company. His mother—his real mother—and his two older brothers died in the "great plague" of 1948. His father remarried, and he remembers his stepmother was very kind to his sister and to him. He had a bicycle all his own. And one day he had another little sister. They were a very happy family.

Then the war came.

Johnny came to in a pool of blood. His mother and father were lying there dead in the street beside him. The bullet that was meant to kill him had only grazed his scalp. (You can still feel the mark.) His sisters hadn't been shot but he didn't know where they were.

The next year of Johnny's life is rather vague. He remembers wandering around with a group of children, eating scraps and begging for food from the hordes who were fleeing south from the communists.

A U. S. military police detachment in Mason, 200 miles south of Inchon, was Johnny's next home. This group of GIs like many others in Korea "adopted" a score or more of the wandering urchins. Johnny was one of these. He remembers sleeping on the floor in a quonset hut beside a pot-belly stove on cold winter nights. Here he learned his first English and lived on C-rations which the American MPs shared with him.

Sergeant Booth's and Johnny's paths crossed in December 1952. Johnny was a big six-year-old now, and a favorite of the MP detachment. Staff Sergeant Clifford Onks had made Johnny his personal charge. But Sergeant Onks was rotating to the States and he didn't want Johnny left alone.

Onks and Booth were friends. They had met in Pusan. Booth was then a First Class Petty Officer assigned to the U. S. Naval Attache's office at the American Embassy there. He and Onks had more in common than the fact that they were Americans in war-torn Korea. They were both soft-touches for the homeless little waifs that trudged the streets and highways of this mangled country.

Booth already had a "family." He lived in a large house in downtown Pusan. An army major who was returning to the States had asked him to "look after" Kwan Yung Ho, a young lad of 13. So Kwan moved in and became his house-boy. Daily there was a line of tiny urchins by his gate when he came home from the embassy. All knew they could count on a bite to eat here.

Then one day a little girl wandered through the gate when it was left unlocked. She was seven. Her name was Yung Ja. She was dirty and ragged and crying because she was hungry. John Booth's heart went out to her and his home became her home.

S/Sgt. Clifford Onks, pictured here in Mason, South Korea, in 1952 with six-year-old Shim Kwan Soo, was one of the detachment of U. S. Army MPs that "adopted" Shim when he wandered into their quarters. Shim, shown in his G. I.-made clothes, lives today in Maryvale.

Johnny Booth looks over his dad's shoulder as they both scan the *Jet Sun,* Luke AFB's newspaper. T/Sgt. John Booth is editor of the paper. After more than two years of legal red tape, Johnny, a Korean by birth, is now the adopted son of Sergeant Booth. His name is John Richard Booth.

One morning a short time later, Booth was hurrying out the same gate and stumbled over a bundle of rags. "But these rags cried," he said. "And when I unfolded them this little baby girl—five or six months old—looked up at me. What's a guy gonna do?"

So little Suzy Kim became a member of the household.

Sergeant Onks knew all this when he went to John Booth to ask him if he would take Johnny. He knew too that John Booth was a "soft touch" where kids were concerned.

And so at 27 years of age and never married, First Class Petty Officer John Booth found himself with a "family" of four. For two years it was a happy and well disciplined family. Each, except the baby, had his daily chores to do. Booth saw to it that the children went to school. From his service pay, he clothed the four. "We did most of our buying through the Sears catalog," he relates. "When those orders arrived from the States it was like Christmas all over again," he says.

But the time came for Petty Officer Booth to rotate to the States. It was a time they were all dreading. Of course, each of the children wanted to return with him. He had been their whole life these past two years. He had cared for them when they were sick. He had helped them with their school work. Played with them. Told them stories of the wonderful land he came from. And they loved him.

Korean and American law made the choice very simple for Booth. Kwan was of draft age now so he couldn't leave the country. And the law forbade an unmarried person to adopt a child in Korea. American law forbids an unmarried male to adopt a little girl.

But Booth had a plan for the only one eligible for adoption. His married sister and brother-in-law in Phoenix, Ariz., could adopt Johnny. And once this was final and Johnny was in the U. S., he would adopt Johnny from his sister and brother-in-law.

And so the plan went into motion. But first arrangements were made for the other children. Yung Ja and Suzy Kim were placed with Monsignor Francis Donovan in the Maryknoll Catholic Mission in Pusan. Kwan and Johnny, temporarily, were left with Rev. John Hunt, the Presbyterian missionary there.

Petty Officer Booth was assigned to the Bainbridge Naval Station in Maryland. He continued to send money to the children and make arrangements for Johnny's adoption. Mr. and Mrs. Bill Keenan, Booth's sister and her husband, went through the legal red-tape for Johnny's adoption. And Johnny arrived in the United States at Seattle, Wash., on Feb. 15, 1956.

John Booth left the Navy in 1957 and reenlisted in the Air Force. He was assigned to Luke and made editor of the base newspaper. Slowly but surely the legal wheels ground through the red-tape. Just recently the interlocutory order making legal this adoption was signed. Sergeant Booth and Johnny celebrated by moving into a new home in Maryvale.

Johnny goes to school at Cartwright II. He's a sixth grader. His dad's eyes sparkle when he speaks of Johnny's grades in his studies. "They're better than I ever got," he says. Johnny has played Little League baseball and last year was one of the fastest runners in his class at school.

To look at this sharp, clean-cut little boy, one could never associate him with the horrors he has known. These eyes that once looked upon death and slaughter each day, now read comic books and watch Wyatt Earp on television.

SLANTS ON SPACE

/// The approach of the next most favorable time for attempting to launch a successful Moon probe finds the hurricane interference danger virtually scrubbed. Four-fifths of the hurricane season is considered spent by the end of October. For November the optimum three-day period centers about the 11th, a date memorable in the Western World as the 40th anniversary of the signing of the Armistice which terminated hostilities in World War I. For December the three-day period is 8-9-10 and again it includes a date of national pride identified with the twin notes of final success and peace, the two elements which are the key words for the country's space exploration program. It was on December 10th exactly 60 years ago that the peace treaty was concluded tnat brought to a close the conflict between Spain and the United States.

/// A successful probe arriving in the space environment where it would be affected by the Moon's gravitational field would be loafing along at a speed of about half-a-mile a second—the rate at which great distances of this long approach phase of the flight would be made, according to astronomical computations prepared exclusively for publication in THE AIRMAN. Known scientifically as "residual velocity" in celestial mechanics, this speed compares with the figure of slightly under seven miles per second a probe would have to ease gradually beyond the pull of the Earth's gravitational field.

/// Although the Moon at its closest approach to the Earth is only 221,463 miles away, when measured by line-of-sight distance, a probe reaching lunar environment at this favorable time would have to travel more than a half million miles following the simplest parabolic flight plan for an estimated 60 hours. An analysis of the mission's velocities show that the probe's average speed would be roughly 9,600 m.p.h., or 161 m.p.m., and 2.3 m.p.s.

/ / /

/// The bewildering complexity of the *Thor-Able* rocket system with its more than 300,000 individual components makes a 1958 model four-door sedan seem like a childishly simple assembly involving a total of only a mere 13,512 different parts.

/ / /

/// U. S. experts differ widely in their forecasts as to the time of the first manned mission to the Moon. The most optimistic is that 1959 is to see this historic event. Others say 2, 5, 10, and up to 15 years. Kremlin crystal-ball gazers see regular lunar passenger traffic within "a matter of the coming few years."

/// A query asks which portion of an artificial satellite moves first when it gets into orbit, its nose or tail? Given normal performance, a satellite's nose, tail, and side all travel together simultaneously at the same velocity. To understand this motion, grasp a pencil at its center and extend it at arm's length, holding the eraser end pointed toward the body. Now turn slowly and complete a circle and the pencil will have made the equivalent of a single ellipse, although its relative position toward the body of the person holding it remains unchanged.

/// Of all the manmade satellites, only one *Sputnik* has deviated from this regular pattern. After orbiting normally for several weeks, it developed a tumbling motion in trajectory and continued to circuit that way losing altitude until its track dropped down to the denser layers of the upper atmosphere where it was incinerated by molecular friction. Unlike the satellites, the cylinders in their final propellant stages have developed a tumbling motion. Scientists in the Free World have been unable to determine precisely what was responsible for starting the *Sputnik* to turn end-over-end in orbit.

/ / /

/// The solar system's escape velocity from a launch site on the Earth or in the vicinity of its orbit is over 26 miles per second, which is more than 1,560 miles per minute or 93,600 miles per hour.

/ / /

/// Prototype of today's towering "birds," the first liquid-fueled rocket with gyroscopic flight controls and instrumentation to record operational data, is preserved in the National Air Museum at the Smithsonian Institution, Washington, D. C., where it is on exhibition with other historic trailblazers in the annals of flight. This rocket was successfully launched in 1929 on a farm near Auburn in central Massachusetts by its inventor, Dr. Robert Hutchins Goddard, a New England-born physicist and college professor. He died in 1945 at the age of 63.

/ / /

/// By far the most intriguing body for probe investigation in the solar system is the planet Venus, the brightest object in the heavens besides the Sun and the Moon. Perpetually wrapped in atmospheric cloud cover, Venus alone denies astronomy the study of the nature of her surface by means of visual or phototelescopes. Such knowledge of the planet as we possess has been developed by other scientific instruments providing data on chemical composition, size, mass, and other characteristics.

W. A. KINNEY

Sgt. Thomas A. Rogato of the Prince George's County Police Traffic Section gives members of Andrews AFB driver education class a few pointers on safe driving. Traffic violations at the base dropped from five to one a day since the course began.

NEEDED: SAFE DRIVERS

Old Problem—New Approach

SIXTY years ago, there were only two motor vehicles in Kansas City. They had most of the entire country in which to operate—3,000 miles across—but happened to be on the same street at the same time and were involved in a head-on collision.

What course the automobile accident rate has taken since nearly 80 million drivers (of varying abilities), nearly 70 million vehicles (from road-devouring sports cars to rattling relics), and nearly four million miles of roadways (ranging from sandy trails to sleek expressways and turnpikes) came upon the scene, is well known. Like the electric charge in a thunderhead, private motor vehicle highway deaths have annually been building higher and higher. Almost six hundred of them last year involved U. S. Air Force personnel.

By way of taking effective action against the causes of these accidents, the Air Force implemented a compulsory driver education program last summer for enlisted airmen under 25. The under-25 age group was chosen because they represent the largest share of the Air Force driving population and, like their civilian counterparts, have a higher motor vehicle accident rate than any other group.

The program's main objectives: to improve driver habits and behavior; reduce injury and death to USAF personnel from private vehicle accidents; decrease personnel losses and costs; and increase Air Force prestige through improved relations with the public.

Although the 10-hour driver improvement course is modified, where necessary, to emphasize local accident problems and conditions at different bases, it generally conforms to the course outline in AFR 32-17 (21 June 57).

Broken down the course includes: in the first hour a discussion of airmen's personal limitations, capabilities, and responsibilities as members of the driving public. The second hour stresses importance of physical fitness to good driving. Mental fitness and qualities that make a safe driver are underscored in the third hour. The fourth hour includes a stopping distance demonstration and consideration of how laws of nature govern an auto's motion. Road rules and signs governing driving, traffic signals, and pavement markings are emphasized during the fifth hour. Objective of the sixth hour is to familiarize the airman with good driving practice and the importance of hazard anticipation and perception. The seventh hour provides information about allowances necessary when driving under adverse conditions. The eighth hour summarizes a driver's responsibilities to himself and others. Accident case histories are studied during the ninth hour. In the final hour instructors determine how well the airmen absorbed the important phases of the course and screen out for further attention those still unprepared to drive.

Since the compulsory driver improvement program for airmen under 25 was established last summer, injuries and deaths from private motor vehicle accidents for this group have decreased. Although rates for personnel under 25 are still higher than for those 25 and older, the trend is downward. This change—shown in Chart A—represents a savings of over two million dollars to the taxpayers.

A recent survey conducted by the USAF Inspector General's Office at 16 bases in the U. S. and Alaska disclosed the Driver Education Program

is receiving command support. Without exception, commanders at bases where inquiries were made indicated the benefits of the program more than offset the expenditure of resources involved.

As Maj. Armando Caseria, who developed the program, points out: "The great majority of vehicle accidents are caused not by physical limitations but by mental deficiencies in driving attitudes and judgment. The Air Force's driver improvement program is designed to accelerate the growth of responsibilty in our young drivers and foster the judgment necessary for accident-free vehicle operation on our Nation's highways."

Whether you are *under* or *over* 25, here are 10 rules that will help you drive safely during the upcoming holiday season:

1. Be courteous at all times while behind the wheel.
2. Drive at a speed safe for existing road conditions.
3. Keep a safe distance behind the car ahead.
4. Observe and obey all regulatory signs.
5. Give proper signals for stop, turns, etc.
6. Never drive or allow others to drive your car while intoxicated.
7. Be courteous to and be careful of pedestrians.
8. Always practice good defensive driving.
9. Keep your car in good mechanical condition.
10. Set a good driving example for others to follow.

—DAVE KARTEN

Chart A

AF Military Personnel Under 25 Years of Age	1956	1957	% Change
Strength	538,353	513,636	- 4.60%
PMV Fatalities	440	378	- 14.09%
PMV Injuries	3,854	3,552	- 7.84%
AF Military Personnel 25 Years of Age and Older			
Strength	378,617	397,228	+ 4.91%
PMV Fatalities	172	208	+ 20.93%
PMV Injuries	1,635	1,464	- 10.46%

Chart B

Grade	No. of Fatalities	Fatalities per 1,000 Personnel	No. of Disabling Injuries	Disabling Injuries per 1,000 Personnel
General	0	.000	0	.000
Colonel	0	.000	5	1.071
Lt. Col.	2	.210	8	.839
Major	4	.180	28	1.262
Captain	5	.121	77	1.868
1st Lt.	18	.433	114	2.742
2d Lt.	4	.250	59	3.680
Warrant Officer	0	.000	11	2.457
TOTAL OFFICER	33	.236	302	2.155
M/Sgt.	18	.325	120	2.170
T/Sgt.	27	.389	242	3.490
S/Sgt.	95	.694	703	5.132
A/1C	122	.812	1,002	6.666
A/2C	144	.762	1,559	8.251
A/3C	126	.938	885	6.589
A/B	15	.438	193	5.629
Cadets & OCS	6	2.800	10	4.666
TOTAL AIRMEN	553	.717	4,714	6.109
TOTAL MILITARY	586	.643	5,016	5.502

A study of distribution of fatalities and disabling injuries sustained by Air Force military personnel in private motor vehicle accidents in 1957, on basis of grade of those involved, reveals facts which may be used to advantage on focusing preventive measures.

Shooting the Breeze

This column depends upon your contributions. If you have any good stories, send them in. Here are a couple from the past.

Typo

Where weighty words were concerned, no one could challenge the monopoly of the Office of War Information, especially after an episode that took place near the end of World War II in the Mediterranean. A MAAF bomber, carrying four tons of psychological propaganda pamphlets, was flying over the Bay of Marseilles when somebody accidentally nudged the salvo lever. The entire load scored a direct hit on a German lighter and sank it. The crew claimed credit for the most spectacular typographical error of the war.

from *Air Force*
January 1945 issue

A Little Learning

A couple of glider pilots, one from Boston, the other from New Haven, home of Yale University, landed with airborne troops behind the enemy lines in Burma, and found themselves all alone defending a road block that cut off the last Japanese line of retreat. A fairly strong enemy patrol had twice tried to break through. Twice the glider pilots had driven them back with a hail of tommy-gun fire, but now ammunition was running low.

The Japanese survivors reformed and launched a suicidal *banzai* charge. The Americans shot down all but one. This one, an officer, came straight up to the barricade brandishing his sword.

Three feet away he halted and screamed, "Go to hell, you beasts, and to me at once all surrender. If not shall horribly die all Yankees."

One of the glider pilots—the one from New Haven—calmly shot the officer through the head with his last bullet. Then he turned to his companion and commented, "That'll teach him to go around talking like a Harvard man."

from *Air Force*
March 1945 issue

MAINTENANCE MINUTEMEN

by Dave Karten

Behind the Air Force planes that stand poised on constant alert, geared to take off within 15 minutes, are the dedicated maintenance men who keep them ready.

Ever since SAC's 15-minute retaliatory alert concept went into operation in October 1957, the maintenance man's way of life hasn't been the same. Where previously every effort had been aimed toward giving him a five-day week, manning the alert force now requires him to be available around the clock. In addition to his regular maintenance duties, he now takes his turn, on an average of twice a month, on alert duty.

For seven days at a stretch he lives in special alert barracks close by the flight line and away from his home and family. His job: waiting for an alarm that may come any hour of the day or night and send him racing to the line to launch his airplane on a fast getaway.

To get the story, THE AIRMAN *recently followed a 99th Bombardment Wing B-52 launch crew through an actual test "alert" at Westover AFB, Mass. Here is the firsthand report.*

"SHE's a go'er!" These three little words, spoken by M/Sgt. Edgar Jackson, alert crewchief, to *Stratofort* 593's aircraft commander after the morning preflight, mean 99th Bomb Wing's B-52 No. 593—readied, fueled, and "cocked"—is safe-to-fly should the warning alarm at Westover AFB sound today.

The preflight over, Jackson posts one man, A/1C Phil Wallander, at the plane, and drives the rest of his crew back to their maintenance alert barracks to "wait the long wait." Only today it isn't long.

Precisely at 1402 hours the raucous, beeping klaxon horns start wailing. In less time than it took you to read this far, Sergeant Jackson, A/2C Tom Gaydos, and A/3C Ed Herman (another man on the crew has the day off) sprint out of their quarters buttoning up jackets as they run. In a moment they are in their alert vehicle, headlights on, speeding down to the flight line, and out to the parked B-52 where Airman Wallander has already started up the (M-D3) electrical and (M-A1A) hot-air power units. "When the alert sounds," says Jackson, "he can see us

coming half a mile away and he doesn't lose any time starting up the equipment."

Haste Without Confusion

In orderly haste, but without confusion, each man goes about his pre-launch chores with speed and know-how. They have 593 "ready-to-go" by the time the flight crew pulls up a minute or two later in a yellow-trimmed, blue, "alert" station wagon. Every member of Jackson's crew knows precisely what to do and does it. There are 25 plugs to be removed from the jet engines, alternators, ram air inlets, and tail; covers to be taken off intakes and tail-pipes. They do this quickly, efficiently with systematic teamwork. Gaydos removes engine plugs on the right wing; Wallander takes the left wing; Herman stands fireguard on the power units. Sergeant Jackson supervises the crew and mans a headset.

A Giant "Comes Alive"

Switches in the B-52 are on when the flight crew gets aboard so all that is necessary to make the silver giant "come alive" is for the pilot to crank up the eight jet engines. Hatches slam shut. Sergeant Jackson waits for the pilot to say: "Ready to start No. 5 engine!" and quickly replies: "Number 5 clear to start, fireguard posted!" The pilot hits the switches in sequence and all eight jets roar up in a piercing, whining, deafening scream.

The pilot clicks his mike to the tower. "Ready for takeoff!" Alert *Stratofort* 593 is set to taxi down the runway and could go aloft carrying more retaliatory power than that of all the bombs dropped by both sides during World War II. In the background, looking on, a team of B-52 specialists stands by prepared to act instantly in event of unsuspected trouble. When the alert is over, Jackson and his launch crew return to their alert quarters. Airman Wallander resumes his vigil at the airplane.

Although today's alarm came at 1402 hours, the launch crew's day began much earlier. They arose at 5:45 a.m. "When all maintenance men get up," Jackson explains, "unless of course there is an alarm during the night." They quickly wash, shave, straighten up rooms, and then eat in the special "alert" section reserved for them in the dining hall. Jackson's launch crew arrives at the airplane by 0730 when the flight crew gets there and together, they pull a complete, thorough, meticulous preflight—checking the long list of items on the checklist—e.g. tires, inflation of struts, hydraulic packs, possible fuel leaks, electronic operation of the aircraft, the radios, and oxygen service. "Sitting there with a very heavy fuel load," says Jackson, "puts a tremendous strain on the tires and we check closely for flat spots.

"If any required maintenance comes up on the aircraft I notify our maintenance expeditor who immediately gets the word to the shop concerned. For example: he calls the hydraulics shop—through job control—if one of the 10 hydraulic packs won't start. Specialists stationed in the respective shops are notified of the malfunction by radio and are instantly dispatched to the aircraft. They quickly determine the cause of malfunction and give us an estimate of how long it will take to fix. This is relayed to the Wing Command Post, and depending on the nature of the trouble and how long repair will take, the command post determines whether or not a substitute alert aircraft will be manned. The minute the malfunction is corrected the aircraft commander radios them his aircraft is again in 'cocked configuration.' "

Except for the man who stays at the plane, Jackson and crew usually return to their barracks by 0930. During the day one launch crew member gets off at noon and one or two of the boys get some sleep so that they can be really "alert" when standing by at night.

Between klaxon blasts Jackson and his men wait around the alert quarters reading, writing letters, or watching TV. From time to time, Jackson like any good crewchief, goes out to his airplane "just to check."

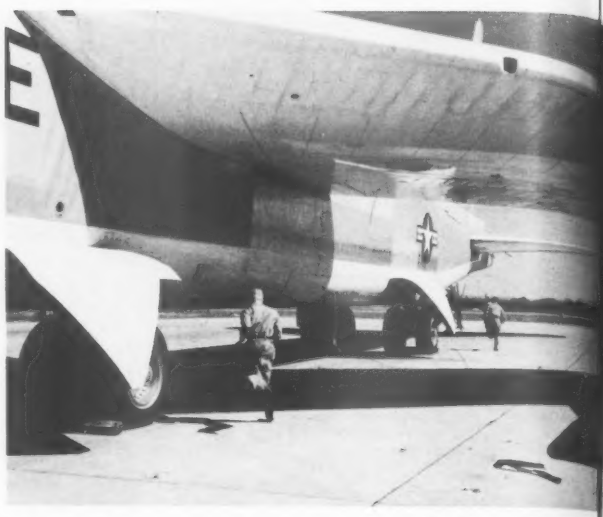
They Stick Close

At 1100 hours one man from each aircraft lunches at the dining hall (where a horn is installed to give him the word if an alarm sounds). After lunch they relieve the men at the aircraft. These men join the rest of the crew at the aircraft and all go to lunch. They stick together at all times. The evening shift eats at 1600, then goes out to the line. The airmen who were relieved then return to the barracks and hit the sack. That's about how a launch crewman's routine day goes, except for one thing—the "routine" can be interrupted any hour of the night or day.

"While alert duty is a serious business from the survival and security standpoint," says Jackson, "maintenance-wise, it's only a matter of standby and routine checking of the airplane standing alert. The real work of getting the big bomber ready is performed prior to its going on alert status. That maintenance job is performed by our same crew with the help, of course, of many highly skilled maintenance specialists from field maintenance and armament and electronics."

There Have Been Problems

"Just what is the biggest change generated by this new maintenance concept?" we asked Col. Wallace Wall, Jr., 8th Air Force Director of Materiel. His reply: "The requirement to sustain aircraft, and personnel on a seven-day-a-week basis. This was accomplished by realigning working periods and holding personnel to a normal work week (40-45 hours with compensatory time off for overtime). There have been problems. Men had to be separated from their families evenings and weekends, but by personnel understanding the requirement for alert and adhering to sound management principles, the impact of maintaining bombers on alert 24 hours a day every day of the year has been accomplished with the least possible difficulty. The maintenance personnel have done an outstanding job in phasing into the alert posture. Their maintenance know-how and willingness have insured the success of this program."



At any hour of the day or night an alarm sends the "Maintenance Minutemen" to ready their airplane for a fast getaway.

When its alert tour is over, *Stratofort* Number 593 will go right back to flying combat training missions along with the other B-52s in the wing. Sergeant Jackson and his launch crew will again serve as its regular ground crew.

To make sure that all its B-52 bombers remain in a constant state of readiness for combat, SAC has adjusted its maintenance cycle to include the period when a portion of the bombers are "on alert." This means flying the aircraft that aren't on alert more frequently in order to provide adequate training sorties for the aircrews since aircraft on alert status are naturally not available for flight training.

"The increased frequency of flying," explains a 99th Bomb Wing maintenance officer, "is now so tight that a 'miss' in planning or managing is tantamount to a 'strike-out' for the next sortie. Daily working hours in many cases had to be increased above normal duty and, while we'd like to award some time off to the ground crews coming off alert, this isn't possible since the big bombers must be launched just as soon after coming off alert status as feasible. The reason? Sitting aircraft deteriorate fast. Hence squatting time has to be kept to a minimum."

Sergeant Jackson: "The real work of getting the big bomber ready is performed prior to its going on alert status."

Stratofort maintenance specialists stand by during alert launching prepared to act instantly in event of trouble.

Wing Command Post supervises 99th Bomb Wing alert and determines when a substitute aircraft will be used in the event a malfunction delays alert takeoff.

The Ground-Air Team

In World War II, the Air Force first became acutely conscious of the ground-air team. As aircraft since that time have become more and more complex, the importance of the ground team has become more and more apparent. "Today's maintenance man," says Col. Robert Neely, 8th AF Director of Operations, "Must be a little bit scientist, electrical engineer, aeronautical engineer, philosopher, and 'grease monkey.' The 1958 Air Force maintenance man is all that—and more."

"When the new alert concept was initiated over a year ago," says Col. O. F. Lassiter, 99th Bomb Wing Commander, "it was immediately evident that maintenance requirements would become more demanding than ever before. The fact that we are meeting this problem successfully and have a smooth-running alert operation demonstrates the versatility of our maintenance system and the people who make it up.

"The dedication and know-how of our ground crew personnel and the teamwork between them and our aircrew members are the backbone of our striking force. How these people live and work is a matter of concern for all of us. Keeping our launch force in ever-ready condition requires devotion and skill far beyond anything we have ever known before, and the men who bear this responsibility deserve our wholehearted thanks and support.

"Theirs is a life of continuous suspense, for wherever they go, from dining hall to the chapel, a klaxon horn is always close by to send them racing to the flight line. Their job is complete only when the bomber is airborne and on the way to the target.

"They know full well that the balance of our national survival may rest on their ability to provide dependable quality maintenance and ready-to-fly airplanes. They also know we're in this business for keeps. From this knowledge stems their dedication to duty."

The ground crews at Westover are typical of the hundreds of aircraft maintenance men throughout the Air Force. Because of their efforts, an alarm that turns out to be the real thing will find us ready "as planned."

T/Sgt. P. J. Pentyer (third from left), 346th Bomb Sq at Westover AFB, briefs B-52 ground crew on operation of landing gear steering cylinders. From left: A/3C R. W. Frampton, T/Sgt. J. D. Bostic, and A/2C R. J. Richi.

You Still Gotta Groom The Mounts

Back in the days before gunpowder it was the armored knight and the well-groomed charger who were the subjects of the town-criers' announcements. Today the combat crewman gets the headlines.

In the medieval world someone had to feed and groom the horses, and that concept hasn't changed one iota. Someone still must feed and groom the "horses" even though their appearance has changed.

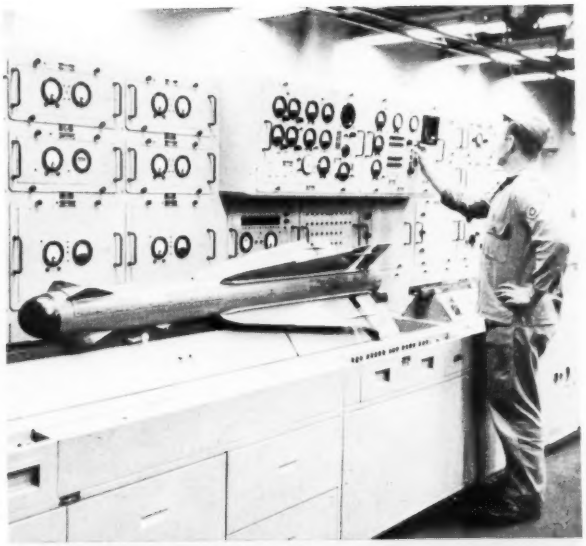
Headlines and glamor go to the knights of combat; the work to the man behind the man behind the gun. There's nothing glamorous about grease and oil, checking out an electrical circuit, or inspecting and folding a parachute.

The uninitiated may not understand the role of the ground-bound lineman, but he can rest assured that the man who rides his white charger not only understands, but also appreciates his worth. The headlines may not salute his labor, but the headline-makers worship his genius.

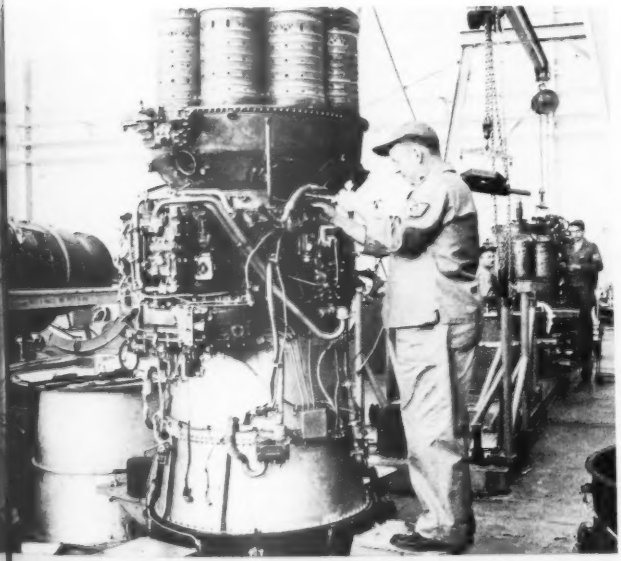
With today's complex "white chargers," you've gotta eat and sleep with your job.

You check, and check, and recheck. The chain is only as strong as its individual links.

But the concentration must not stop at the combat machine—the knight of combat needs aid too.



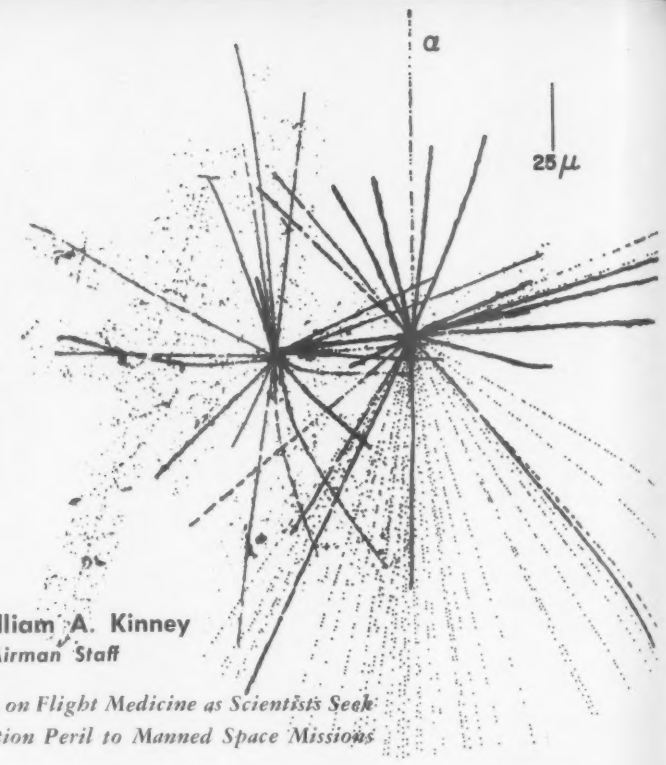
Now the job has become doubly complicated with the addition of deadly rocket armaments.



Even when the aircraft is aloft, the job goes on, assuring replacements when they are needed.

It's a constant battle to keep that aircraft ready for flight at all times.

NOT BY A Single Bound



by William A. Kinney
Airman Staff

Big Meteorites Go AWOL on Flight Medicine as Scientists Seek to Neutralize New Radiation Peril to Manned Space Missions

IN THE long chronicle of man's slow but systematic taming and conquest of the wild or hostile forms of life and physical forces which make up the world around him, the most taxing effort on his determination has been the test of facing up to the invisible and unseen. It has ever been the sternest trial for his fortitude and his dedication to any particular cause, be it the advancement of knowledge for knowledge's sake, patriotic service to his nation, or sordid personal gain.

There are many critical chapters where the sudden introduction of the unknown and invisible into a promising situation has had the effect of braking progress to a dead halt, sometimes ruinously reversing it. This was particularly true in the ages when civilization was struggling to emerge from the foggy wraiths of superstitions, fears, and uncertainties. Flying rumors and whispered old wives' tales panicked whole cities and countrysides in times of plagues and pestilence. Ambitious enterprises were abruptly abandoned in dread because of the intervention of some invisible convulsion of nature which produced a temporary visitation of havoc. Armies in the ascendant have dissolved in confusion under the impact of new weapons or alien forces launched in an unseen, unorthodox way against them. And this is not confined alone to ancient annals.

As the Nation's scientists and military personnel commissioned by ARPA to support their IGY mission face up to many problems besetting the methodical penetration and exploration of space, they find themselves again confronting the challenge of invisible natural forces, one whose identity is already known, the other a newly discovered menace of serious magnitude.

Man's next critical bounds into the reaches of space must carry him safely through the "celestial gravel pit" where micrometeors and meteors richochet and hurtle at speeds of some 3,000 m.p.h. Those bounds must also take him across a high velocity shooting gallery where he will be under the continual drumfire of invisible interplanetary particles of immense energies and lethal in potential.

ABOVE: *How fragments of matter fly after a hit by a high-velocity primary cosmic ray is shown by artist's copy of the "signatures" of two rays impacting in the emulsion of a photographic plate. An incoming primary reaches the emulsion traveling vertically and "explodes" one of its atoms in a pinwheel pattern. The particles of molecules thus smashed acquire some of the terrific energy of the original primary and become secondary rays. Tracks reveal to scientists properties of new-born particles. Flying particles from the impact make emulsion grains just as light rays would do, so that this mysterious cosmic phenomenon "takes" its own photograph. A hit on human cell tissue would produce like effects.*
Photo courtesy Bartol Research Foundation

How do flight-medicine experts and other scientists regard the chances of overcoming or neutralizing these two physical antagonists who at first glance seem as intimidating as any legendary pair of fire-breathing, armored dragons jealously guarding the sacrosanct retreat of some evil wizard of old against intruders?

The answer is that, while some complexing new elements have been injected into the overall picture, they have not yet dictated any drastic revision in the initial cautious optimism with which physician-scientist teams applied themselves to the task of assuring man reasonably safe passage through whatever hazards space might hold.

And now to resume the rundown.

Meteors and Cosmic Dust: The great vault of space beyond our atmosphere has been tagged the "celestial gravel pit" because it is filled with innumerable speeding objects called meteors, micrometeors or meteoroids, and

meteoric or cosmic dust and debris. They may be huge masses of many tons or minute granules. Estimates of the number daily entering our atmosphere run into the multi-millions.

In the past these objects have posed an insignificant peril to conventional aircraft because all but relatively few are incinerated by the intense heat generated by their passage through the upper atmosphere. Hence a meteor or meteoroid rarely survives to reach the altitudes of today's flight. By those levels this heavy barrage has become the fine ash of the cremated metal, stone, or fused metal-stone projectiles and sifts harmlessly down toward the surface.

Prior to success with orbiting satellites, scientists had to rely on the estimated number of meteors and cosmic debris penetrating the Earth's atmospheric envelope in trying to arrive at a total likely to be found populating space beyond.

A progress report to the American Astronautical Society late in August discloses, however, the estimates have proven to be a poor basis for such a projection, in one respect. Satellite reported data indicate the rain of these interplanetary objects is far heavier than scientists previously believed.

According to preliminary analysis, the meteoric-micrometeoric content in space may be as dense as 200,000 a cubic mile. Most of the objects, however, are only dust specks or slightly larger granules in size although having a velocity in the order of seven miles per second. The applied significance of this new information is that spacecraft design now must reckon with the tentative likelihood that each square inch of a vehicle's skin will be impacted up to 20,000 times annually.

What reappraisal has this discovery necessitated in the prospect for manned missions in the not too distant future?

Surprisingly enough it turns out to be nowhere as ominous as it seems to sound. It may even be quite encouraging. In fact, the preliminary study indicates this.

Earthbound man's knowledge of meteoric bodies comes almost exclusively from the nocturnal fireworks displays when—in the form of so-called shooting stars, fireballs,

SPACE RADIATION GLOSSARY

Long a harmless, friendly word in the language, radiation has fallen into the "scare" category with many unthinking persons who have come to associate it exclusively with potentially dangerous byproducts of nuclear fission. The better informed know that much of the radiation found in daily life is either harmless, helpful, or beneficial when properly controlled. They are aware that the human body is a source of radiation for it gives off warmth in the form of heat rays and that other forms of light radiations have a wide range of good uses from medical therapy to heating the beer fermentation vats in breweries.

Here is the ray rundown that interests space medicine:

Alpha Rays—Invisible particles, the cores of helium atoms, with two electric charge units. The alpha particles present in cosmic radiation can penetrate considerable thicknesses of matter, animate or inanimate, a capability not shared by the alpha radiation emitted during disintegration of radioactive substances.

Beta Rays—Invisible particles, positively or negatively charged, emitted during radioactive disintegration and having 100 times the penetrating power of the alphas. Those with positive charges are called positrons; with negative charges, electrons.

Cosmic Rays—Invisible, subatomic particles of immense energy which keep the Earth under continual "bombardment" around the clock, raining in through exterior space at speeds approaching the 186,000-miles-per-second velocity of light, itself. This radiation reaches the edge of the Earth's atmosphere as what are called primary rays, bulletlike bits of matter with such incredible penetrating power that they can pierce a thick sheet of metal as easily as a piece of surgical gauze.

Collision with infinitesimal molecular components of the atmosphere dissipates much of their initially high energy. As a result, they reach sea level in the form of secondary, tertiary, or even weaker rays. Despite these filtering effects, some primary rays do penetrate to and beneath the Earth's surface. Gaps exist in current knowledge as to the major sources and properties of cosmic rays and their effect on man at remote space-flight altitudes where the atmosphere is too thin to have a protective filtering character.

Gamma Rays—The most dangerous radiation produced by radioactive decay with penetrating powers so high that it can pass through thick layers of lead or other metals, unlike the betas and non-cosmic variety of the alphas which can be stopped by metallic shieldings. Gammas, like X-rays but more penetrating, travel at the speed of light, 186,000 miles per second, being by nature the same type of radiation as light.

Infrared Rays—Invisible radiation of longer wave length than visible light rays and noted especially for heating effects.

Ultraviolet Rays—Invisible radiation with frequencies of shorter wave length than visible light rays. They range from just below the visible to the so-called X-ray region. They cause chemical reactions in the skin that generate vitamin D, for example, and are also largely responsible for sunburn.

X-rays—Electromagnetic radiation of much shorter wave lengths than visible light rays. The rays are able to penetrate various thicknesses of many substances, but can be stopped by other materials of great density in composition, such as lead.

New Varieties—Still not positively classified as to character is the high altitude zone of intense radiation discovered by *Explorer IV*, which began reporting from orbit July 26.

Some of these "hot" particles have energies up to 400 million volts, an amount that would be fatal to a human being exposed for a little over a day. Processed data shows the intensity varies in the layer from two to four roentgens—the hourly unit for measuring X-ray strength. Beyond the belt the count declines, reaching 0.3 roentgens at 60,000 miles. The latter is the precise X-ray dosage normally sanctioned weekly in regular medical practice.

and seasonal meteoric showers—these objects from the "celestial gravel pit" move through the upper atmosphere burning luminously bright from molecular friction.

Science knows that it takes a meteoric body of some mass to produce luminiscent effect visible from the surface. This led to the hypothesis that the proportion of major meteors in the "gravel pit," itself, should be approximately the same.

It followed, according to this hypothesis, that meteoric masses of such magnitudes and smaller constituted a definite peril. Obviously a meteorite or micrometeorite of any bulk, perforating a sealed cabin, would cause explosive decompression with instant death to any occupants who had shed helmets and pressure suits.

The satellite data already analyzed, however, surprisingly fail to bear out the existence of the supposed existing ratio of medium and large masses to the smaller and tiny population. As this issue goes to press, no satisfactory explanation of this apparently strange discrepancy has been advanced.

To judge from the study, the satellites have been encountering only micrometeoritic dust which does no more than pit and abrade the exterior skin, although having the undersirable effects of raising the internal temperature and very gradually impairing orbiting performance. This erosion and pitting evidently proceeds at such a minor rate that the metal's condition would not become hazardous until after long periods in orbit.

Flight medicine still recognizes the fact that a meteoritic impact of any size would disintegrate a spacecraft in violent decompression, but if additional data from satellites continue to corroborate that analyzed for this recent study, then the bugaboo of sudden meteoritic annihilation can be written off as an extremely long shot in calculating risks.

The combined life of artificial satellites already put in orbit now exceeds a total of four years, a goodly stretch of time for these bodies to be plying through the "celestial gravel pit" around the clock with no common damage beyond hull abrasion.

Meanwhile, scientists are wondering whether space will continue to duplicate the same mystifying meteoritic phenomenon which has been the unvarying rule on Earth. Although an uncounted number of sizable meteorites have fallen in the past centuries, there is no documented case on record of a direct hit on a human being with death resulting.

Fingers remain crossed, however, and the accumulating data will remain in the "preliminary" category for some time to come because thus far it has been of the almost-too-good-to-be-true variety. The idea of a light metallic "bumper" for the hull is still being investigated for its possible protective capabilities against all but meteoritic bodies of great mass.

Thus, as things now stand, the peril of the "gravel pit" stands provisionally downgraded to the status of a remote hazard such as one normally attending any exploratory enterprise or pioneering mission.

Celestial Radiation: On the basis of present scientific knowledge, the emissions of primary concern to flight medicine are those prevailing within our solar system, the only conceivable operational area for manned devices in the far foreseeable future. Radiation phenomena existing

BUT IT'D BE FAR WORSE ON THE MOON: For acres around a gargantuan scar gouged by a mighty meteorite in Canada's subarctic, five billion tons of giant boulders, all blasted from solid granite, litter the approaches to Chubb Crater with a two-mile wide belt of tumbled debris. The Earth's atmosphere consumes most meteoric bodies before they reach the surface or cuts down the size and velocity of those which do. Lacking this dense atmospheric protection, the Moon would have suffered greater devastation from such a meteorite impact.

© National Geographic Society

or suspected at vast distances in our Milky Way's stellar formations or elsewhere among the teeming galaxies of the Universe can be of only incidental and academic interest now for obvious reasons.

The radiations with current priority may be divided into two broad categories, those originating with the Sun and the cosmic rays. Advanced planning wisely did not rule out the possibility of finding new manifestations of these two familiar radiations or even the discovery of hitherto unknown types which would call for a new crash program in research. This foresight in assuming nothing was vindicated late in July when the discovery of an intensely "hot" new band of high altitude radiation found the science flight-medicine team ready with an immediate investigation project.

As the most familiar celestial body to most men, the Sun commands first attention. At its surface Old Sol generates light, heat, X-rays, and radio waves. Only these last may be dismissed as having no known significance biologically.

At the Earth's surface, the other main forms of solar radiation are essential or beneficial to life generally and hence not harmful except in cases of long overexposure. Our atmosphere serves to filter out the X-rays and the radiation reaching the ground is limited to the visible and near infrared variety, with a very small proportion of the ultraviolet.

If the skin is overlong exposed to strong sunlight, severe sunburn results due to the effect of the ultraviolet ray components. There is a growing school of medical thought which blames regular, prolonged overexposure to strong sunlight as a contributing factor leading to skin cancer in

some persons. Undue exposure, as man is well aware, also may cause sunstroke, as well as temporary or permanent eye injuries under unusual circumstances. Plainly, solar radiation on the surface rarely produces the need for a physician's attention.

Radically different is the story affecting manned space missions. With 99 percent or more of our filtering atmosphere left behind, personnel would be subjected to virtually the full intensity of solar radiation. Unprotected, human beings and most other living organisms could not endure this full range even briefly.

Neutralizing this enormous flood of energies, however, turns out to be something less than a labor of Hercules. Miniaturized air conditioning units alone can maintain comfortable cabin temperatures despite the intensity of the radiant heat bathing the hull of their craft. As for the searing ultraviolet rays, these can be rendered impotent by using transparent material with a high filtering capability for cabin windows.

Solar X-rays? Most are of the "soft" variety, with small penetrating power. Minimum shielding can eliminate this peril.

The problem of coping with previously known forms of cosmic radiation beyond our protective atmosphere does not promise to yield to anything like so ready a solution. At the moment these rays pose the second largest question marks for flight medicine in the radiation field. Evidently only data accumulated by manned missions can supply eventual answers on many points.

From the first identification of this radiation in pre-WW I days until comparatively recently most medical opinion was that the rays reaching the ground exerted no harmful effects. One theory held that centuries of evolution had developed in man a tolerance to them just as in the case of climatic or other environmental conditions. Of late, however, some scientists have come to view this radiation with suspicion as being a contributing factor in physiological changes or disturbances. These range from such relatively minor things as the greying of hair or onset of baldness to the incubation of cancer—one of the most ancient scourges to afflict mankind.

As with solar radiation, cosmic rays reaching the surface are greatly weakened by their passage through the atmosphere. However, 23 miles, or about 120,000 feet up, spacecraft will come under direct bombardment by these particles with high energies ranging from 100 million to 10 billion billion electron-volts. From that 23-mile altitude onward all such radiation encountered will be what are called the original "primary" rays, consisting of approximately 10 to 15 percent alpha particles, from one to two percent heavier nuclei, and the rest protons or hydrogen nuclei.

Once primary rays collide with a piece of matter, whether a single molecule or a multimillion cell organism, violent reactions occur. Striking deep into human tissue, rays can produce effects comparable to some produced by radiation from nuclear fission. Such effects vary from minor, well within human tolerance, to those of serious gravity. The critical uncertainty here is whether a primary ray, penetrating a sensitive part of the body like an eye, brain tissue, or sperm cell would inflict extensive damage. In the last named component, injury of a genetic nature with harmful hereditary effects would be transmitted to future generations.

In its quest for more representative clinical data under operational conditions, flight medicine has the advantage of knowing that there are zones where the cosmic radiation bombardment has a relatively slow rate of fire, so to speak. Thanks to this, it will be possible to adopt orbit plans in belts of relatively low intensity. Exposure of personnel thus would be quite brief, minimizing this possible hazard while more comprehensive data was being compiled.

The relatively low intensity zones extend from 50 degrees north and south of the Earth's cosmic ray equator.

"ROUTINE MISSION" DISCOVERY: The North American Continent owes thanks to the USAAF and the RCAF for locating its newest natural wonder, Chubb Crater, in upper Quebec Province, west of Hudson Strait. Over two miles wide and a quarter-mile in depth, Chubb is the world's largest known meteoritic crater. Rim's high point is 500 feet above surface of lake formed in deep gouge after meteorite's impact. Scientists estimate the celestial projectile hit at a velocity of between 32,000 and 150,000 miles per hour. Photo points up meteorite hazard in lunar exploration. First clue to Chubb was caught by small detail in aerial photograph made by a USAAF weather plane on routine flight, June 20, 1943. Covering this Ungava region five years later in a Dominion photomapping project a RCAF plane obtained a closer picture which came to public attention in 1950. A joint National Geographic Society-Royal Ontario Museum expedition investigated in 1951, establishing the crater's meteoritic origin.

© National Geographic Society

This is located some 550 miles or eight degrees north of the more familiar geographic equator and in the Northern Hemisphere it runs through the Gulf of Panama, although some longitudinal variations occur elsewhere around the globe.

Significantly, until July's launch of *Explorer IV* on a different, specialized investigation, all U. S. satellites had been placed in orbits within this low intensity belt and have transmitted an impressive store of data on cosmic ray activity there. This, combined with data accruing from IGY's extensive research, should equip flight medicine with a comprehensive scientific profile on the subject in ample time for the maiden manned space missions.

Research during the 1940s developed evidence that the intensity of this radiation keeps increasing beyond the latitudes of 50 degrees north and south respectively of the cosmic radiation equator. In North America this intensity climb continued into the subarctic and theoretically this indicated a maximum intensity near the polar regions. Studies in recent years, however, have recorded a marked decline in the radiation's intensity, leading physicists to speculate that all primary rays are having their great energies reduced by some deceleration or cut-off mechanism in space, or that a similar result is being effected by some other screening action. No hypotheses are known as to the likely duration of this energy-degrading phenomenon.

A wholly different complication is that in space flight equivalence zones cosmic ray behavior is unlike that in most of our atmosphere where they travel groundward in a generally vertical direction. From the atmospheric end zones outward these subatomic "bullets" fly in about every direction. Hence even orbiting in the belt of minimal intensity spacecraft will be under fire from practically all sides. To what extent this multidirectional bombardment would multiply the exposure hazard clearly must be determined with utmost accuracy.

To provide complete shielding would involve a lead sheathing approximately 37-inches thick. Thus an 8 x 4 x 5-foot cabin would require over 40 tons of lead, obviously prohibitive additional weight for space hardware in the present phase of rocketry development.

After complete analyses of satellite and IGY data, however, scientists believe it will be found that much lighter shielding will be efficacious protection on short missions. From these, scientists expect to start getting the now lacking information about human tolerance to the radiation at 23-mile altitudes upward.

Once missions reach the phase of days or weeks, cosmic radiation effects on personnel will have to be carefully re-evaluated in light of expected new knowledge to be acquired, to determine whether a calculated risk is medically justified.

As matters stand today, however, experts are in agreement that minimal exposure to the radiation can be guaranteed in short, pioneering missions. Yet for future longer missions, the cosmic ray problem is considered neither intimidating nor impossible of solution.

This leaves the question of the extremely "hot" layer of intense radiation—rated as several thousand times more intense than cosmic rays—whose discovery splashed scare headlines across front pages this summer.

Opinions of scientists, canvassed by THE AIRMAN for the purposes of this article, varied as to the origin and permanence. Initially most seemed inclined to the belief that the "hot" belt is or had been caused by ionized gases, spewed out at high velocity by the Sun. In this electrified layer are fairly high-energy protons—positive charges of electricity—some with energies exceeding 50 million volts, which penetrate the hulls of investigating satellites.

Some offering the hypothesis indicated they thought the process responsible for the "hot" zone had ended, others speculated new solar storms of electrified gases replenished it intermittently.

The most recent theory advanced as this issue goes to press is put forth by a noted authority on cosmic radiation, Dr. Martin A. Pomerantz of the Bartol Research Foundation of The Franklin Institute of Philadelphia. His tentative conclusion is that the zone is due to a cosmic ray "albedo" phenomenon, which is to say that after original "primary" rays have been converted into secondary rays by collisions with molecules in the upper atmosphere some rebound into exterior space again, streaming backward with respect to the incoming rain of other original "primary" rays.

Uncertainty still clouds the extent of the peak-intensity hot layer. First analyses of data from the spectacular October mission of the *Pioneer* indicated it had a depth of more than 16,000 miles before the radiation count declined. As for variations in layer's intensity, discrepancies in the *Pioneer's* readings leave them inconclusive pending further study. The Earth's electromagnetic field acts as an "umbrella" to keep the zone's rim 600 miles distant although some radiation does "drip" down to altitudes as low as 250 miles.

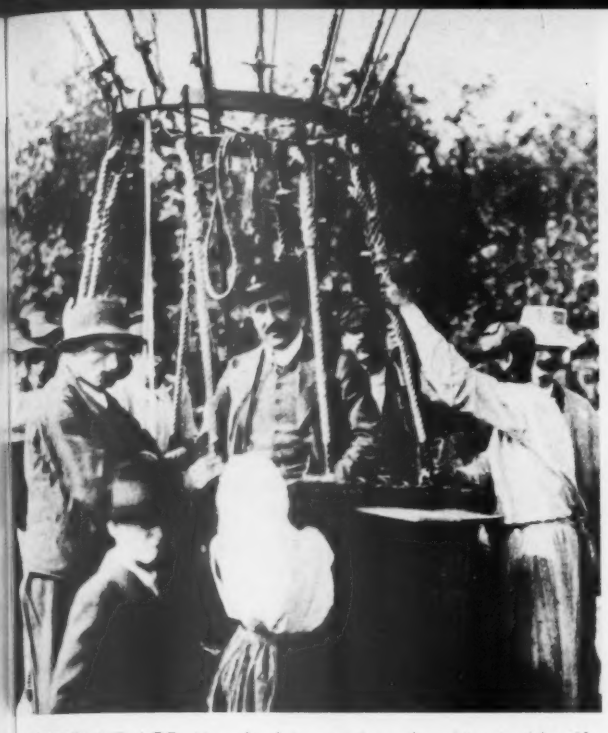
Paradoxically, for about 20 degrees around the Earth's poles there is reported evidence that "holes" in the radiation may exist. Hence Dr. Herbert F. York, head scientist of DOD's Advanced Research Projects Agency, speculates that polar launch sites may be needed to put man in orbit.

Several experts are on record that a journey across the "hot" reservoir would be fatal for man, yet others of as high repute vehemently dissent that such a grim conclusion is justified by data to date.

Dr. James Van Allen, University of Iowa physicist and planner of the cosmic ray research program for the *Explorer* satellites, offers this appraisal: "It is likely that (conventional) cosmic rays themselves are not a serious biological hazard, but this new radiation is something to worry about." The "hot" radiation zone, incidentally, has been dubbed the "Van Allen Layer" in his honor.

Now until greater scientific certainty develops, are prospects pretty grim? The considered answer of Nobel-Prize winning Dr. H. J. Muller on the entire radiation subject is that he sees "every reason to anticipate that we can be successful in extending our conquest of the third dimension without genetic or other radiation damage to humanity that will correspond with all the benefits to be derived."

Meanwhile research is progressing on chemical medication for internal use to counteract the effects of radiation. A promising report appeared in recent months on an experimental pill form which has shown very salutary protective results when given to laboratory animals exposed to high-level radiations. Far more tests are essential, how-



CREDIT AIR AGE: Man had to get into the skies to identify cosmic radiation. Although subjected to it since creation, man was not aware of this phenomenon until 1910 when Dr. Victor F. Hess, Austria-born physicist, established the fact the Earth is bombarded by a constant rain of high-energy, high-velocity particles from exterior space. When his ground experiments went inexplicably wrong under ideal laboratory conditions, he repeated them in the Eiffel Tower, Paris, and detected a definite increase in radiation interference. An amateur balloonist, he experimented airborne and found the radiation's intensity climbed with altitude. An American citizen for many years, Dr. Hess at 75 is still active on the faculty of New York's Fordham University. Above photo shows him upon landing after experimental scientific flight in 1912.

Photo courtesy Dr. V. F. Hess through Fordham University

ever, before the pills can be tried on man even experimentally.

Some help, too, may be forthcoming from findings resulting from the program of radiating certain forms of plantlife now being carried on at the farm maintained by the Associated Eastern Universities at Brookhaven, Long Island. In these experiments some wild varieties of many flowers continue to flourish undamaged after exposure to high-level radiation 20 hours daily whereas the common species weaken and die in a few generations. The secret is the wild varieties have a much larger number of genes —the units of heredity—than the others in the family.

Geneticists tell me that the same heredity laws responsible for this phenomenon also theoretically apply to human beings, hence it should be possible to breed radiation-resistant space personnel with many times more the normal heredity units. The name for such a creature, in case anyone is interested, is the *polyploid man*. No such experiment is contemplated, however, for it would play havoc with that well established institution, S-E-X. Polyploid humans, it was explained, probably would prove to be mainly of one sex with a lot of intersexes. Probably, too, the—shall we say "conventional"—existing methods of human reproduction would become impractical and it would be necessary to devise some other way to accomplish that purpose.

Both military and civilians have been exposed to such a heavy barrage of pro and con argument in the current controversy over the dangers, or lack thereof, from radioactive fallout, nuclear tests, atomic devices, and the like that radiation has become to so many a dread bugaboo word.

In reviewing the foregoing material on celestial radiation before I started putting it into as readable and understandable language as possible, I talked off the record to a rising young physician of brilliance and promise, who specializes in radiobiology.

"I think events have let the question of radiation get grotesquely out of perspective. We have eminent authorities who view with alarm the increase in radiation due to the testing of atomic devices by various nations. Some equally eminent authorities regard them as needlessly alarmists. We must keep in mind that medicine throughout its history has been compelled by progress of research and discovery to shift its ground regarding accepted professional beliefs, some of them very fundamental, and not infrequently that shifting has approached the radical. Since the introduction of the X-ray, for example, opinions on its value for diagnostic and therapeutic work have undergone several alterations and we are in the midst of another reappraisal at present.

"In August the University of Vermont was host to the first International Congress of Radiation Research. While general agreement existed on some basic theories, the diversity of opinion on others was wide and professionally stimulating for me. One distinguished physician argued that all radiation, whether it be from granite boulders or a luminous wristwatch dial, shortens man's life. An equally able radiobiologist in another presentation reported his studies gave some indications that chronic exposure to minor radiation may not be injurious but might even help promote longer life. Another opinion clash occurred on whether radiation accelerates normal aging processes.

"I was particularly interested by a paper submitted by a British scientist which concerned Strontium 90, regarded as the most disquieting element in radioactive fallout which gets into the diet through milk and dairy products. Once in the human system it tends to localize in the skeleton leading to the malignant condition of leukemia and bone tumors. He reported that eating a few Brazil nuts would introduce many thousand times as much Strontium 90 radiation into a person's system than he would get daily from the prevailing fallout of that element in Britain. The nuts contain 1,700 units by his count as against only two for liver or kidneys and one or less for fruits and vegetables.

"Nothing can shake my quiet conviction that medical research is certain to find ways either to neutralize radiation by material protective measures or to counteract it by developing new medications. Perhaps even newer type radiation is due for discovery later on, but I tell you neither these nor any other dangers or drawbacks are going to keep man from getting into space and probing

steadily deeper the more sophisticated his hardware becomes. I'm glad I'm in medicine; it is the most stimulating and rewarding profession for it cues in the whole drama of life. In space that drama will be infinitely more exciting and for medicine the next generations should be the richest, most productive in the great story which goes back to Hippocrates and Galen."

The Indispensable Component

"Man," mused a general officer of the medical corps, "that superb complex of knowables and unknowables about whom all our countdown on readiness centers." He quoted the descriptive words of the Old Testament for the progeny of Adam, " '. . . a little lower than the angels.' Here is your indispensable component that is the key to the riddle of how the drama scarcely begun is to unfold."

His subject held him in rapt contemplation. " 'Fearfully and wonderfully made,' the Psalms call him, and remember that line from Shakespeare; '. . . such stuff as dreams are made on.' And he looks to the fulfillment of the greatest dream which can come to pass in mortal life. What a component system of incredibly complex instrumentation he represents. Yet after centuries we have succeeded only in partially calibrating his potential for precision performance and still we cannot say what that percentage is.

"There are two things, among others, about man which are unique," he pursued. "One is his seemingly inexhaustable resourcefulness. The other is incredible capacity for adapting himself to undersirable, even hostile environments and conditions which his genius has been unable to overcome or moderate. Resourcefulness and adaptability, these are fabulous assets to count on as medicine prepares to put man in space with whatever protection he may need there and also for returning him alive and well to the friendly sanctuary of his normal habitat.

"Resourcefulness and adaptability, these have paced the calvacade of mankind in every important advance since that grand procession began in the shadows of the dim, primordial mists with the shambling steps of shaggy, prehistoric brutes.

"Take a little time out," he counseled. "Reflect on that. Consider how far we have come, this generation of such high destiny."

It was and is a good suggestion which I pass along to personnel of all grades. We stand today in the mid-20th Century atop something like a continental divide which promises to separate the age when man's interests and strivings were perforce confined almost exclusively to the physical things about him at or near the surface of his recently shrunken globe and the dawning age where he looks forward adventurously and with courage to using the Earth as a staging base for sorties into the universe beyond.

Since the cavalcade began to move aeons ago through the primordial mists in a hostile land of mammouth beasts and eerie surroundings, how far has man come? Physically over the hundreds of centuries, he has evolved to a sturdy creature capable under conditions of modern civilization of achieving superior intellectual, technical, and artistic skills.

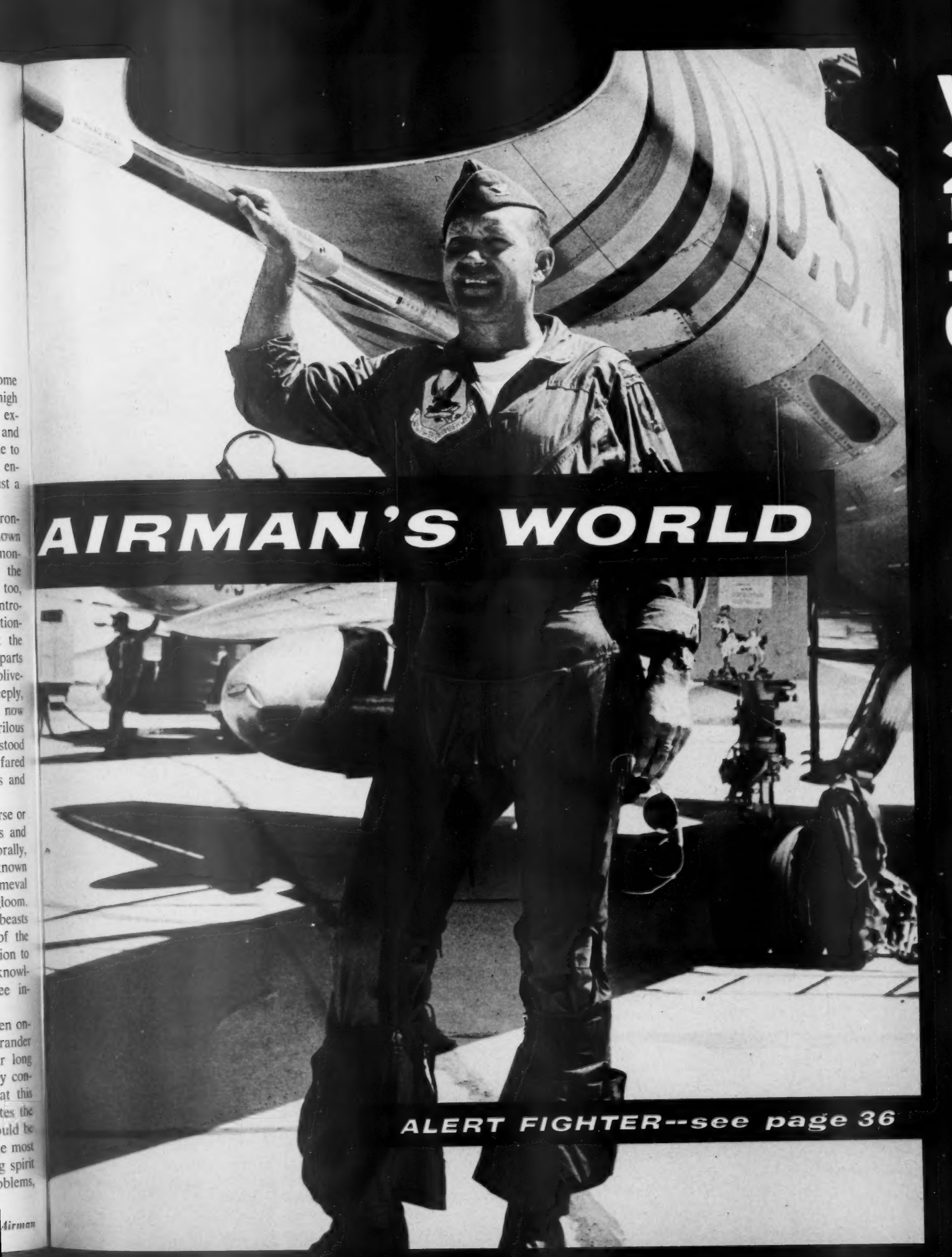
In this process of evolution the human body has undergone change or acquired better capacity among some creatures. For example, there are people inhabiting high mountainous areas who, during the long centuries of exposure to the thin character of their local atmospheres and its low air pressure, have adjusted so that they are able to perform very laborious work without ill effect in an environment where similar exertions would soon exhaust a man transplanted from life at sea level.

And intrepid man has braved the most hostile environments his planet has opposed him with, and he has shown he can do so indefinitely with success. He has demonstrated he can live comfortably and work well in the killing cold of the polar wastes. He has done that, too, in the torrid head of dank, steaming jungles by the introduction of his own packaged environment—air conditioning systems—which outdoes the protection against the fierce sun which evolution has given natives of such parts by darkening the skins pigmentation from sallow-and olive-complexioned to negroid black. Man has delved deeply, too, into the bowels of the Earth. His inventiveness now enables him to live pleasantly in the depths of perilous seas for weeks on end. Finally, not only has he stood on the threshold of exterior space, he has already fared beyond this new vertical frontier a number of times and returned safely to tell of its magic lure.

Besides variously accommodating himself to adverse or even inimical environments, man by resourcefulness and adaptability has been advancing intellectually, morally, socially, scientifically, and technically since an unknown primitive family huddled at the first fire one primeval night when the law of the jungle ruled the encircling gloom.

He has become master not only of the predatory beasts of the jungle but also of the miraculous might of the atom; he grew civilized and advanced that civilization to steadily better planes, thus promoting the causes of knowledge, education, government, and justice for free individuals.

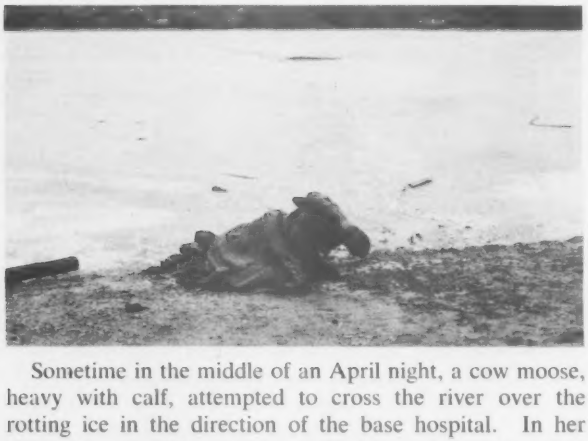
The whole progress of the cavalcade has ever been onward and upward to new rendezvous, each ever grander than the previous one, with rare exceptions never long altering the trend. With this in mind, one can only conclude that—for the cavalcade which has arrived at this mid-century continental divide and now contemplates the mesmerizing vistas of the Space Age ahead—it would be a crash reversal of history's entire pattern if only the most ignominous of defeats is in store for man's questing spirit and his ingenuity in setting at naught barriers, problems, hazards, even seeming "impossibles."



ALERT FIGHTER--see page 36

MEDICARE AND THE MOOSE

Now that winter ice is again forming on the rivers and streams of the 49th state, hospital personnel at Ladd AFB, Fairbanks, Alaska, recall the story of a strange patient who came their way as last season's ice was breaking up on the Chena River.



Sometime in the middle of an April night, a cow moose, heavy with calf, attempted to cross the river over the rotting ice in the direction of the base hospital. In her interesting condition it was probably no more than pure coincidence that she chose the hospital as her destination, but medics spied her in the early morning hours struggling to extricate herself from a hole in the ice about 70 feet from shore. The animal was frightened, exhausted, and the hide on her body was rubbed raw by the struggle.

Airmen calmed the beast as best they could, hitched a sling of ropes around her, and managed to get her to shore. Two veterinarians, Capts. George Rose and Jack Douglas, found that her temperature had slipped to 95.4 from a normal 103, and administered two quarts of saline-glucose solution to replace lost fluids and restore energy.

For a time, the patient, resting under a canvas covering, appeared to be doing well, and about 12 hours later ate a modest luncheon of hay. The optimistic vets predicted a quick recovery and an early release. During the night, however, the patient began to fail. The airmen moved her indoors to a warm warehouse, administered penicillin and stimulants, but the animal failed to respond. The shock and exhaustion were simply too much to overcome.

Although loss of the patient was disappointing to all concerned, the extent of the effort to save the moose and her calf is notable. Herbert Spencer wrote, in 1851, "The behavior of men to the lower animals, and their behavior to each other, bear a constant relationship."

THE LATEST MOVE

First elements of more than 9,000 NCOs from 21 surplus career ladders who have been ordered retrained prior to the end of April, will begin their schooling early next month.

The latest directive eliminates the voluntary phase of earlier training messages and is designed primarily as a means of assuring that experienced noncommissioned officers are fitted into the most needed slots.

Surpluses in the 21 fields affected by directed retraining represent 87 percent of the overall USAF total of 22,000 NCOs in overstaffed fields. The Air Force is expecting a shortage of 25,000 NCOs in the fields into which these men will retrain. These figures are projected through January 1959.

Quotas totaling 9,031 have been assigned to the 11 major stateside commands. These men are earmarked for attendance at 30 schools teaching the fundamentals of critically short skill areas.

The affected AFSCs are 291X0, 293X3, 301X0, 421X1, 431X1A, 431X1B, 431X1C, 432X1, 462X0, 471X0, 603X0, 621X0, 622X0, 623X0, 641X0, 64171, 64172, 702X0, 73170, 741X0, 751X0, 771X0, and 922X0A.

The 30 schools are AB 20230 (Radio Traffic Analysis Aide), AB 20330 (Language Specialist), AB 27330A (Aircraft Control and Warning Operator), AB 27330B (Data Processing), AB 29231 (Radio Intercept Operator), AB 30133A (Aircraft Electronic Countermeasures), AB 30133B (Aircraft Electronic Countermeasures Repairman: Jamming Equipment), AB 30332C (Aircraft Control and Warning Radar Repairman: AN/FPS-20, AN/FPS-6, and IFF), AB 30332H (Aircraft Control and Warning Repairman: AN/GPA-37), and AB 30333A (Automatic Tracking Radar Specialist: Radar Systems).

Also AB 30430A (Radio Relay Equipment Repairman: Microwave), AB 30430D (Ground Communications Equipment Repairman: Heavy, Relay Center Equipment), AB 30431B (Flight Facilities Equipment Repairman: ILS), AB 30431C (Flight Facilities Equipment Repairman: TACAN), AB 30432B (Ground Communications Equipment Repairman: Light, VHF-UHF), AB 30433A (Ground Communications Equipment Repairman: Heavy, Transmitter), AB 30433B (Ground Communications Equipment Repairman: Heavy, Receiver), AB 32130E (Bomb Navigation Systems Mechanic: K-series), AB 32130K (Bomb Navigation Systems Mechanic: MA-2), and AB 33130A (Weapons Fusing Systems Specialist: Electronic).

Finally AB 42132 (Aircraft Hydraulic Repairman), AB 42230 (Instrument Repairman), AB 42231 (Mechanical Accessories and Equipment Repairman), AB 43133 (Inflight Refueling Specialist), AB 43135 (Aircraft Fuel System Mechanic), AB 53430 (Airframe Repairman), AB 56230 (Gas Generating Plant Operator), AB 64131 (Organizational Supply Specialist), AB 64132 (Supply Records Specialist), and AL 70430 (Stenographic Specialist).

COMMUNITY SUPPORT

Recently the city of Spokane, Wash., proved itself a community which appreciates the local Air Force personnel when it turned over to nearby Fairchild AFB a $25,000 lakefront site for development as a recreation area.

For several months local USAF people searched for an area near the base. Several previous arrangements had been marred by the requirement for long hours driving to and from the site.

Finally, within a few miles of the base, and almost virgin area was found on Clear Lake, but $25,000 was

needed to insure long-range use of the lake site. The money simply wasn't available through USAF channels.

The Spokane Chamber of Commerce, in appreciation of the role played by Fairchild personnel in the various facets of Spokane life, started a campaign to purchase the site. Through personal donations and solicitation the project was successfully completed a few weeks ago and the area transferred to the Air Force for future development.

Base volunteers started work on the property the same day, building access roads and parking areas and clearing and leveling the beach and boat-launching areas.

Such generosity and support is not new in the Inland Empire area. Seventeen years ago some of the same public-spirited citizens raised over $100,000 to purchase the land for a proposed air base. They donated it to the War Department and Fairchild stands today as a tribute to their truly community spirit.

OUR LORD OF THE AIRWAYS

This huge oil painting by Mrs. Fran Rosser, an Air Force dependent, was unveiled recently at the Webb AFB, Tex., chapel.

The ceremony was a part of Sunday morning services which also included the initial rendition of a new hymn, *Lord God of Earth, of Sea, and Sky,* written especially for the ceremony by Chaplain (Lt.) Verlin E. Mikesell.

The four by six-foot painting represents a composite idea of Mrs. Rosser and Chaplain Mikesell. It depicts the spiritual relationship between people in the Air Force and the Creator.

Mrs. Rosser began her career in 1955 and has earned wide acclaim in her native Southwest. She is the wife of M/Sgt. William Rosser, stationed at Webb AFB.

INSURANCE RIDER

Veterans Administration officials have announced that most in-force insurance policies may now be eligible for addition of a new-type total disability income rider for a small additional premium cost.

Under the provisions of Public Law 85-678, which became effective at the beginning of this month, policyholders who become totally disabled from any cause before age 60 and while the rider is in effect, will receive an additional income of $10 per month per $1,000 face value of the policy. Previous disability limits were five dollars per thousand.

More than 85,000 veterans have the earlier attachments already in effect, and those who meet the requirements may increase their coverage at the new rates.

Policyholders in good health and under age 60 may have the rider added to their policies except for a limited number of disabled veterans who have purchased policies since April 1953. Estimates place the number eligible at more than five million.

Payments under the clause begin after total disability has existed for six consecutive months, and continue for the duration of the disability.

Premium cost will vary according to the age of the policyholder, and full information may be obtained from any VA office.

NEW TRAINER

Latest official estimates indicate that USAF's first supersonic trainer, the Northrop T-38, will be ready for Air Force duty sometime during calendar year 1960.

Roll out ceremonies for the twin-engine trainer were accomplished in mid-August, nearly a week ahead of schedule. Designed to train pilots for a new generation of space-age craft as well as conventional fighter and bomber missions, the aircraft is presently being produced in evaluation quantities.

Because of its light weight (only one-half to two-thirds that of standard USAF fighters) and relatively low landing speed, the T-38 requires no drag chute. It is the first trainer capable of delivering Century Series performance.

Twin General Electric J-85 turbojet engines provide a strong safety factor. In the event of engine failure during takeoff, the plane can become airborne on one engine, climb to a safe maneuvering altitude, and return to the airfield.

Instructor and student are seated in tandem in individual pressurized, air-conditioned cockpits enclosed by separate jettisonable canopies. The instructor rides behind and 10 inches above the student for proper surveillance and forward visibility. Both cockpits are fitted with ejection seats.

YOU ASK IT

Surplus Airmen Into Required Skills

Q. I am a S/Sgt. who retrained from a surplus 7-level AFSC into a needed Air Force Specialty under the provisions of the Retraining Program for Career Airmen. I have progressed to the 5-level skill in the new career ladder and I have just been informed that I cannot be entered into training for the award of a 7-level AFSC since my unit does not have a 7-level vacancy. When I retrained I understood that I would be permitted to train to the 7-level skill in the new field. I cannot be considered for promotion in the new skill since I cannot progress to the 7-level skill. Since I retrained from a 7-level AFSC why can't I be trained to the 7-level in the new skill?

A. The Retraining Program for Career Airmen was designed to retrain surplus NCOs from indirect-support skills to meet NCO requirements in direct-support skills. The shortages in the direct-support skills are in all NCO grades, therefore M/Sgts., T/Sgts., and S/Sgts. who are surplus to indirect-support skill requirements are being retrained to meet the requirement for their grade in the direct-support skills. Since the requirement for S/Sgt. in direct-support skills is larger than the requirement for M/Sgt. and T/Sgt. it is not possible to provide for advancement of all S/Sgts. trained into the new skills. Therefore, some S/Sgts. will not be permitted to train for the award of a 7-level specialty. Air Force Manual 35-1 requires that M/Sgts. and T/Sgts. be trained to the 7-level skill since that AFSC is commensurate with their military grades. However, S/Sgts. need only train to the 5-level skill since that level is commensurate with the grade of S/Sgt. S/Sgts. are permitted to train to the 7-level skill only when their organization has a current or projected requirement at the 7 level. Since your organization does not have a vacant 7-level position to which you may be assigned it is necessary that you continue to perform duty at the 5-level skill. To increase your qualifications for advancement to the 7-level skill at a later date it is suggested that you continue to study for skill advancement through an informal type program.

Q. My control AFSC is listed in AFR 39-8 as a surplus skill. I am being directed to retrain into a locally required skill. I do not desire to retrain. Is such action legal?

A. Yes. Unit commanders are charged with the responsibility for retraining surplus airmen into required skills.

NINE ACRES OF EFFICIENCY

Tachikawa AB, Japan, boasts the largest warehouse in the Far East, a fitting corollary for USAF's largest area installation.

Personnel of Warehouse 3, largest USAF activity under one roof in Japan, have erected a huge sign in front of the building which reads, in part, "Nine Acres of Efficiency."

Warehouse activity at AMC-operated Tachikawa is divided into Sections I and II. The first comprises nine

buildings; the latter is confined to Warehouse 3. It stores nearly twice the number of items housed in all of Section I. Primarily operated as storage area for aircraft parts and accessories, the warehouse has stocked items which ranged from washers, costing less than a cent each, to engines, worth as much as half a million dollars.

Building construction was started by the Japanese just prior to the end of the war and completed by the Air Force in 1947. During its early years it was known as the haunted warehouse because it was erected on the site of a local cemetery. When strange noises and shadows added credence to the superstition, investigation was ordered. Eventually a stray black cat was routed from hiding and operations returned to normal.

SUPPLEMENT

A distinctive badge has been adopted to supplement the time-honored brassard worn by USAF recruiters. The badge became official last month.

Circular in design, the metal device of blue, white, and gold will be worn centered on the flap of the right breast uniform pocket. Its chief purpose is to provide a more distinctive identification of personnel performing Air Force recruiting duties.

The brassard will still be used at fairs, in recruiting booths, and on other occasions where immediate identification from a distance is important.

ALERT FIGHTER

Deployment of TAC's second Composite Air Strike Force in less than six months was completed recently when Col. Arleigh Blood (see photo, page 33) led the 388th Tactical Fighter Squadron to Formosa. Leading elements were in position within 15 hours after being alerted.

The Yellowtail Squadron from Cannon AFB, N. Mex.,

equipped with North American F-100 *Super Sabres,* is maintaining a full duty schedule. Colonel Blood, commander of the parent 312th Tactical Fighter Wing, has assumed field command of the unit during its operation.

Upon arrival, pilots and ground crews were divided into three alert shifts. Hottest is the five-minute group which remains within yards of their "charged" birds. A second is on 15-minute call; the third, one hour. A majority of maintenance personnel is imbedded in a nearby hangar, while those on alert are housed in pyramidal tents close by the flight line.

BITS OF BLUE

. . . Over $100 million in contracts were officially closed within the last two months for Capehart housing construction. Twenty bases in the United States and Hawaii will benefit with a collective total of more than 7,500 units programmed for construction in the near future.

. . . The United States Post Office Department has announced the establishment of a new post office: United States Air Force Academy, Colo.

. . . The 73rd Bombardment Squadron (Heavy) has been alerted to return to the ZI. In January, they will be transferred from their present station, Ramey AFB, Puerto Rico, to Seymour Johnson AFB, N. C.

. . . Rewritten Airman Proficiency Tests (APTs) in six career fields will be ready in time for the January-February-March, 1959 testing periods. Affected fields are Intelligence (20); Wire Maintenance (36); Utilities (56); Accounting and Finance and Auditing (67); Statistical Analysis, Data Processing, and Programming (68); and Medical (90).

. . . The Secretary of Defense has approved a request to air condition four 200-man airmen dormitories at MacDill AFB, Fla.

AIR AGE LIBRARY

Professional

The Air Force: From Civilian to Airman, M/Sgt. Lawrence C. Landis, USAF, (The Viking Press, $2.00). "The United States Air Force, in contrast to the other armed forces, is a young service—not in years alone, but in spirit as well." Those are the opening lines from this excellent guide and sourcebook for the young man or woman planning military service. USAF advantages for either a single tour or a career are weighed carefully.

Soviet Strategy in the Nuclear Age, Raymond L. Garthoff, (Frederick A. Prager, Publishers, $4.50). A definite, incisive analysis and discussion of Soviet military planning and strategy in the nuclear-jet-missile age. Reviews and discusses present and future military plans and thinking of top Russian strategists, and the role of missiles and rockets in Soviet military structure. Considers Soviet views on tactical atomic warfare, thermonuclear war, limited war, strategic and tactical air forces, ground forces, and seapower.

Technical

Spacepower, What It Means to You, Donald Cox and Michael Stoiko, (The John C. Winston Co., $4.50). This is not a technical treatise on rockets and missiles, nor is it science fiction. Rather it is an analysis of the profound changes which may well take place from the social, economic, military, and legal aspects of space exploration. How will the space age affect your home, job, mode of living, and world peace?

Adventure

Non-fiction

The Millionth Chance: The Story of the R 101, James Leasor, (Reynal and Co., $4.00). The dramatic tale of the greatest airship ever built. Larger than an ocean liner, she was designed to inaugurate regular airship service around the British Empire. England's Secretary of State for Air described her as "safe as a house—except for the millionth chance." That chance brought tragedy.

Fiction

Kent Barstow, Special Agent, Rutherford Montgomery, (Duell, Sloan and Pearce, $3.00). The first of a proposed series of novels featuring Lt. Kent Barstow, Air Force intelligence trouble shooter and special agent. The scene in this one is in Japan and Korea and centers about a test of the bamboo curtain air defense effectiveness against USAF's F-102A.

"WE'LL DRINK ANYTHING"—Air Force and Navy units recently completed a nine-day interservice training period, believed to be the first of its kind ever held in the Philippine Islands area. Termed highly successful, the operation was climaxed by a mid-air refueling demonstration between Navy AJ2s of Heavy Attack Squadron 16, and USAF North American F-100D *Supersabres* of the 72d Tactical Fighter Squadron.

PRO PAY IS HERE

Proficiency pay, the long-awaited and much-debated third benefit of Public Law 85-422 which cleared Congress late in May, became effective this month and will be reflected in increased end-of-the-month salary checks for slightly more than 13,000 airmen.

PL 85-422 provided for three major changes, all aimed primarily at improving retention and quality within the Air Force. The first was the across-the-board pay raise in June; the second, establishment of E-8 and E-9 grades —initial E-8 promotions were made in September.

The entire program is based on several principles, all pointed in the same direction—increased efficiency. Primarily pro pay will be confined to the most needed skill areas and is being introduced in the hope it will improve retention. Increased retention not only means increased proficiency, but also reduced training and operating costs throughout the USAF.

Implementation of the special pay was held up temporarily by interservice-Department of Defense conferences designed to assure the greatest uniformity throughout all of the services. While individual service programs may differ in administration, each will be generally compatible with that of the sister services.

Originally scheduled to begin in September, last minute Dept. of Defense adjustments held up its inauguration until after the majority of wrinkles had been successfully ironed out. By way of partially compensating for the delay, Air Force has combined the September-December pro-pay quotas into the single first round list which was implemented on November 1 and provided for roughly 13,000. The balance will be allocated in approximately equal quotas in March and June, 1959, bringing this fiscal year total to slightly more than 25,000.

Lists released earlier this month included personnel from 30 AFSCs. Approximately 225 newly-promoted E-8s were included. Twenty-six additional AFSCs will be added for the remaining 12,000 FY '59 slots, bringing the total affected to 56 in the current fiscal year. Qualifying criteria for personnel in these fields was outlined in ALMAJCOM messages dispatched in July and October respectively. Unit of assignment commanders will authorize the pay with wing level classification board certification.

Personnel officials believe some additional adjustments are going to be necessary before the plan reaches final form. The first steps are designed primarily to test the most practical methods of administration and will be wholly flexible.

For example, in its initial experimental stages, only the P-1 grade will be authorized. Although a maximum of three proficiency levels were provided for in the new law, P-1, P-2, and P-3, at maximum monthly dollar levels of $50, $100, and $150, respectively, a trial level of $30 has been established by the D. O. D. for the experimental period.

By July 1, 1959, the program will undergo complete evaluation before subsequent stages are given the green light. Future actions will be governed by existing circumstances and Air Force needs before final approval is forthcoming for FY '60.

Even after it is in full operation, the program will be subject to semi-annual review and will fluctuate according to equipment and USAF requirements.

The 56 AFSCs selected for inclusion in the initial year of the program were carefully screened and approved by members of the Air Staff after lengthy discussions with personnel officials. Department of Defense recommendations, Cordiner testimony, training investment, aptitudes, and occupational requirements were all carefully worked into a rating scale before arriving at the final list of eligible skills.

Those selected are not the only critical skills which exist within the Air Force structure. As General White has repeatedly pointed out, every job is necessary and important, but some are more critical in terms of training time and cost, plus retention of the job-holder.

Additionally, inclusion of a skill now does not mean that AFSC will automatically remain on the list in future years. However, when a skill is scheduled to be phased off the pro pay list, airmen who are receiving pro pay in that field will become eligible to retrain in the new field, if they desire and can qualify, and will continue to draw the added money while undergoing training.

By law, the final total of men receiving pro pay cannot exceed 15 percent of USAF enlisted strength. Under this restriction, and assuming USAF strength remains relatively stable during the four-year implementation period, approximately 107,000 men will eventually grace the lists. However, stress must be placed on the fact that these figures are educated guesses and no unqualified statement is possible until the prime experimental period has ended.

Under Air Force restrictions, only 5- and 7-level skill personnel are eligible for the added pay except in career ladders where no 5-level exists. In these few instances, 3-level personnel may qualify.

Once a man's name appears on the pro pay list, he will continue to draw the increased income as long as he remains qualified and as long as the skill is critical. However, possession of a critical AFSC alone is not sufficient grounds for receipt of the added money. Many men, holding critical AFSCs are not presently working in those fields. Until they are reassigned—and every effort will be made to this end—they cannot be considered eligible for the additional pay.

Enactment of PL 85-422 triggered repeated assurances that increased efficiency would be the keynote of future personnel actions. Implementation of the three major phases of the pay bill might well be termed the "icing" of the improved quality program. Additional personnel programs are almost certain to follow and non-producers and marginal airmen are certain to come in for more minute scrutiny. If the most proficient producers are to to rewarded, the least proficient, logically, may be expected to pay the costs.

In the Name of Congress . . .

Photo courtesy National Archives

THE MYSTERY OF AN AIRMAN

by M/Sgt. Hal Bamford

FORTY years after his death, the story of Lt. Frank Luke, Jr., is still shrouded in a veil of mystery which defies solution. The circumstances of his death, the number of his victories, and even his final resting place have never been unalterably solved.

Frank Luke had shown an irrepressible desire for excitement throughout his life. At Phoenix, Ariz., high school he was an outstanding athlete, active in six sports. Within two months after graduation in 1917, he applied for admission to the Army Air Service. Less than a year later he reported for duty as a member of the 27th Aero Squadron, 1st Pursuit Group, in France.

Two months later, Lieutenant Luke was dead, a hero at 21. His brief, combat career earned him this Nation's highest award, the Medal of Honor. During this restricted period he scored a total of 18 official victories, became America's second leading ace of World War I, and perfected a dusk attack which was so successful it earned him the nickname, "Balloon Buster."

These are facts. They are among the few concerning Luke which are unclouded by mystery. Almost any other reference to his career must be tempered with personal judgment. Depending on the authority used, the story of Frank Luke may wander to nearly any extreme.

His citations tell a brief but vivid story. The first record of decoration, the Distinguished Service Cross, appears early in his combat career. The citation was for "extraordinary heroism in action near St. Mihiel, France, September 12, 13, 14 and 15, 1918," for destroying eight enemy observation balloons during the cited period. His

second, a cluster to the DSC, came three days later, for destruction of two balloons and three aircraft on a single mission. Eleven days later, Luke flew the mission for which he earned the Medal of Honor.

The mystery which surrounds his exploits is a persistent enigma throughout the story. Gene Gurney in his book, *Five Down and Glory,* mentions that Luke's first victory was scored on August 6. Lt. Col. Harold Hartney, Luke's commander and author of *Up and At 'Em,* cites September 12 as the day of Luke's first official kill.

Officially the young Arizonan was credited with 18 victories; 11 balloons, seven aircraft. Yet, various accounts differ even to this total. Capt. Eddie Rickenbacker, in his famed *Fighting the Flying Circus,* notes that on September 18, Luke had scored a total of 14 victories in the prior eight days. The citation for his final mission on September 29 officially credits him with an additional five kills which would boost the score to 19. Colonel Hartney mentions at least 10 additional unconfirmed victories, including the one of August 6, which would indicate a total of 28.

The story of his final day might well date from the middle of September and the first of two missions on which he scored five victories. The glory of this mission was dimmed by the death of Lt. Joseph Wehner, his closest companion and oft-time flying partner. Luke was awarded his second DSC and a 10-day leave and went to Paris to brood over his lost friend.

On September 26, the Meuse-Argonne offensive began. According to Hartney's account, Luke returned to his home base of his own accord before his leave was up.

From this point on every telling of that final fateful mission differs in some respect. The contemporary account, published in the Air Service Newsletter of April 19, 1919, begins, "The Congressional Medal of Honor has just been awarded to Lieut. Frank Luke, Jr., Air Service, of Phoneix, America's second ace, who was killed in action, September 29, 1918, after bringing down two enemy planes, three balloons, and about a dozen German soldiers."

The official citation which accompanied Luke's posthumous award makes no mention of the aircraft to which this account refers. Others are equally vague regarding that final day. No one seems to have been able to keep an exact account. Early in the evening he flew over an American balloon position, however, and dropped a note advising them to watch some enemy balloons a short distance behind the German lines.

Promptly on the predicted minute, each of the three balloons went up in flames. Luke was never seen again. The mystery of his disappearance has never been completely solved. An official communication from Graves Registration recounts an heroic tale which may well be the story of his final moments of life.

"From: Graves Registration Officer, Neufchateau Area No. 1

To: Chief of Air Service, APO

Subject: Grave, Unknown American Aviator

1. Units of this service have located the grave of an unknown aviator killed on Sunday, September 29, 1918, in the village of Murvaux.

2. From the inspection of the grave and interview held with inhabitants of this town, the following information was learned in regard to this aviator and his heroism. He is reported as having light hair, young, of medium height and heavy stature.

Reported by the inhabitants that previous to being killed this man brought down three (3) German balloons, two (2) German planes and dropped hand bombs killing eleven (11) German soldiers and wounding a number of others.

He was wounded himself in the shoulder and evidently had to make a forced landing. Upon landing he opened fire with his automatic and fought until he was killed.

It is also reported that the Germans took his shoes, leggings and money, leaving his grave unmarked.

CHESTER E. STATEN
Captain of Infantry
G. R. S. Office"

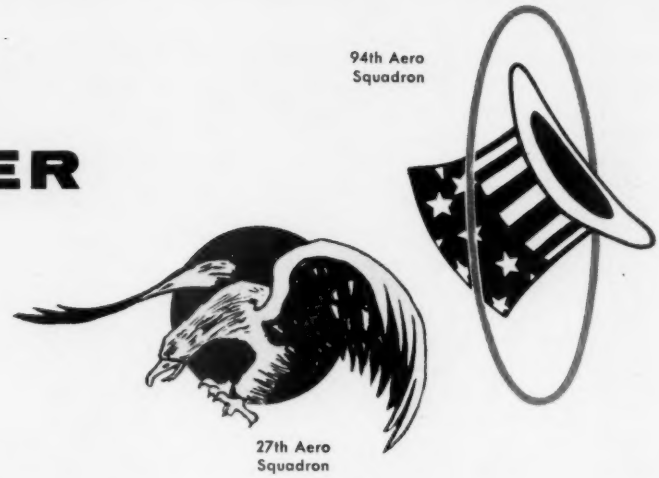
The citation which accompanied Luke's Medal of Honor presentation in 1919, the first actual award to an Air Force man, would appear to support the fact that this unidentified airman was indeed Frank Luke.

Luke earned the nickname, "Balloon Buster," by knocking German observation balloons similar to this from the skies.

"After having previously destroyed a number of enemy aircraft within 17 days, he voluntarily started on a patrol after German observation balloons. Though pursued by eight German planes which were protecting the enemy balloon line, he unhesitatingly attacked and shot down in flames three German balloons, being himself under heavy fire from ground batteries and hostile planes. Severely wounded, he descended to within 50 meters of the ground, and flying at this low altitude near the town of Murvaux opened fire upon enemy troops, killing six and wounding as many more. Forced to make a landing and surrounded on all sides by the enemy, who called upon him to surrender, he drew his automatic pistol and defended himself gallantly until he fell dead from a wound in the chest."

Despite the mystery surrounding the death of this famed airman, 2d Lt. Frank Luke, Jr., is a symbol to airmen of every generation. His memory is enshrined in Arizona, his home state. There, as a lasting tribute to a great American, stands Luke AFB, dedicated to a hero.

EITHER CONQUER OR DIE



America's oldest air combat unit is still going strong.

Its motto—Aut Vincere aut Mori . . .

AIR FORCE history is still brief enough to have but few coincidental occurrences, and although aerial participation in World War I was limited to a few hastily assembled units, one of those organizations fostered a classic of coincidence.

America's first two Air Force Medal of Honor recipients were members of the same group—Capt. Eddie Rickenbacker, who commanded the 94th Aero Squadron, and Lt. Frank Luke, the leading ace of the 27th Aero Squadron. Both organizations were assigned to the legendary 1st Pursuit Group, the oldest air combat unit in this Nation's history.

The group was an outgrowth of the 1st Pursuit Organization and Training Center, activated at Villaneuve-Les Vertus, France. It was converted into a combat unit in April, 1918. The original units were the 94th Hat-in-the-Ring and the 95th Aero Squadrons. Two months later, two additional squadrons were added—the 27th and the 147th. In October a fifth unit, the 185 Aero Squadron (Night Pursuit), was assigned.

Recorded accomplishments of organizational members during the few months they served in combat are exemplified by the stories of Rickenbacker and Luke, but a roll call of other members conjures up a vision of aerial near-perfection. Among them were Raoul Lufbery, Quentin Roosevelt, Hamilton Coolidge, and James Norman Hall, co-author of *Mutiny on the Bounty*.

At war's end, the group was inactivated. However, in March, 1919 it was reactivated and assigned to Selfridge AFB, Mich. The 94th and the 27th retained their original designations and the 147th was redesignated as the 17th. Until 1932 it was the only fighter organization of the United States Air Force.

Between the two wars many of USAF's illustrious served as members. Gen. Henry H. Arnold, Gen. Carl Spaatz, Lt. Gen. Ira Eaker, the late Gen. John K. Cannon, Gen. Curtis LeMay, Vice Chief of Staff, and Lt. Gen. Emmett J. O'Donnell, Deputy Chief of Staff for Personnel, all wore the 1st's spurs.

With the outbreak of World War II in Europe and mindful of ominous rumblings in the Pacific, the 17th Pursuit Squadron was detached in October, 1940 and dispatched to the Philippines. Its place was taken by the 71st Pursuit Squadron.

Within an hour after word of Pearl Harbor's disaster had reached this Nation, the group moved to the West Coast and there, because of superior training and experience, began supplying cadre personnel for the 31st, 52d, 58th, 80th, and 82d Fighter Groups. However, the unit was too valuable to serve long in such a capacity and in July, 1942, the squadrons flew the Atlantic to Gourock, Scotland, the first such mass operation in USAF history.

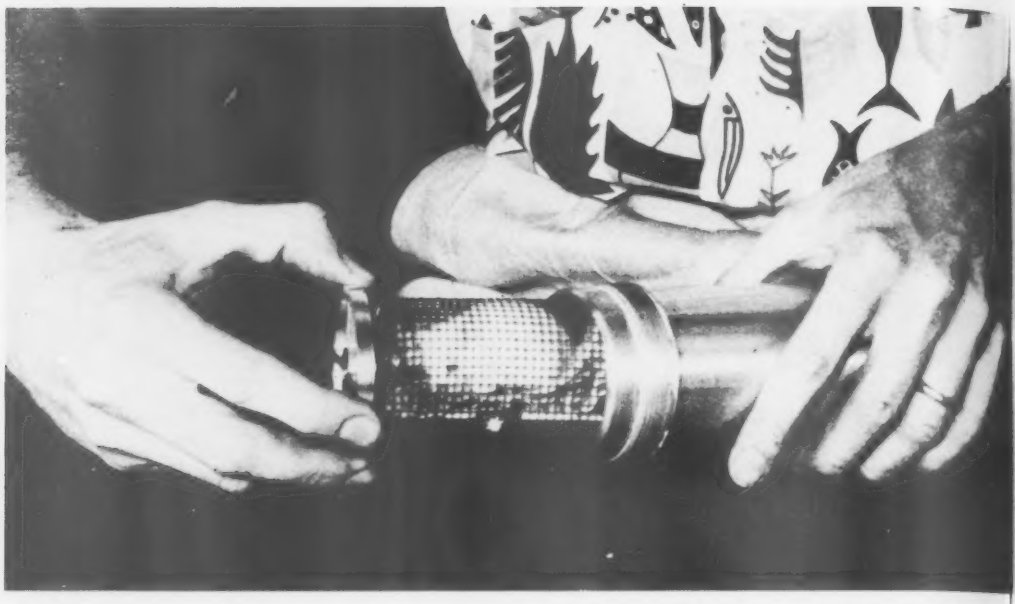
Beginning in October, 1942, they provided a part of the aerial cover for the invasions of North Africa, Sicily, and Italy, and late in 1943 transferred their operations to the Salsola airdrome on the mainland.

In August, 1944 they were detached to Corsica to serve as fighter cover for the invasion of southern France, and the following January were again detached, this time to fly fighter escort for President Franklin D. Roosevelt's *Sacred Cow* on his mission to Yalta.

Shortly after the war ended the unit was moved to Caserta and on October 16, 1945, deactivated. On March 6, 1946, it was reactivated as the 1st Fighter Group. Deactivation again occurred in February, 1952. Finally the group was returned to active participation on June 20, 1955 as the 1st Fighter Group (Air Defense).

Operating under that designation, the group presently has but two squadrons—the original 94th and the 71st Fighter-Interceptor. Both are based at Selfridge.

Despite the changes, the spirit of the 1st Fighter Group remains high. Its motto, *Aut Vincere aut Mori*, translates to "either conquer or die." Twice it has had a large share in combat actions.



First space mouse—MIA I (Mouse in Able)—in the canister which was aboard Thor Able I, the missile launched last April. The first mouse known to have been launched into space, the animal played an important role in flight medicine research.

OF MICE AND MOLDS

Two of man's ancient enemies in the animal and vegetable kingdoms are fighting on his side today in the struggle to unlock the mysteries which exist in the exterior environment of space. They are the mouse and that simple form of plant life, the mold or fungus.

From time immemorial mice have been carriers of disease and pestilence. They also have looted world granaries of foodstuffs worth fabulous fortunes. Molds also have blighted crops, spoiled larders, and induced illness by tainting provisions. In the nose cones of experimental rockets and in the gondolas of stratosphere training balloons, however, they yield invaluable data for scientists striving to put together the jigsaw pieces of the picture of conditions to be encountered by future manned missions.

Medicine discovered the value of the house mouse, *mus musculus,* for experimental laboratory purposes in the 16th century and generations of the miniature animal since have contributed enormously to great progress made since in combating and controling the spread of infectious disease as well to campaigns against other ills which beset humanity.

The "wee, sleekit, cow'rin', tim'rous beastie" Robert Burns sung of in his famous poem makes a popular laboratory research animal because it is economically small in size, inexpensive, shortlived, and exceptionally fertile. The combination of short life span and prolific breeding habits enables medical research workers to study any changes transmitted by parent mice through several generations of offsprings all in the course of a single year.

Although helpless when newborn, a litter will be able to shift for itself in about two weeks. Mice mature sexually at the age of a month and a female may bear from five to six litters annually of from four to eight young each. A *mus musculus* that reaches a third birthday is getting along in years; at twice that age it would qualify as a Methuselah.

Pioneer Stowaways

The house mice, like the first colonists, migrated to the New World from Europe and lived up to their traditional reputation of following man wherever he went except to Eskimo igloos.

To *mus musculus* a house affords a good protection against natural enemies as well as shelter plus an almost guaranteed supply of food. No finicky eater, it will go for about anything in the cupboard as well as paste, glue, soap, leather, match heads, and rags.

So great is the appetite it may eat as much as a quarter of its weight daily. Full grown, however, its weight ranges anywhere from a mere half-ounce to an ounce and a half and the size from six to eight inches long, including three to four inches of tail. Mice don't put on weight because their constant activity burns up food-produced

energy almost as fast as they get it. They never sleep, keeping on the go day and night.

Normally mice guzzle as much water as they consume food, but the familiar white mouse of research laboratories has shown ability to survive for long periods on a daily ration of only a single drop of H_2O. Climatic conditions don't faze the critters much; they've been found breeding and apparently living normally in temperatures of 20 below zero and in torrid environments with temperatures as high as 120 degrees Fahrenheit.

They can be easily trained and taught simple tricks or programmed routines, the latter useful for behavior pattern study in space cone devices. Another desirable feature is that a strain under observation can be easily maintained by selective breeding.

In experiments since the beginning of 1950 on space research the Air Force has used both males and females in rocket cones to the outmost of one percent of the atmosphere. The mice sometimes are equipped with dosimeters to register the amount and kind of celestial radiation to which they are subjected. Black and mottled mice hit by certain cosmic ray particles have developed white or grey hair in the pelt portion impacted, evidence that this radiation may be a factor in the greying or discoloring of human hair. Descendants of such animals many generations later are being studied to see how this and other genetic changes induced by the radiation are being transmitted and their cumulative influence on the progeny's overall good health. It is an exalted role for the congenitally larcenous beasts, now industriously seeking to steal one of the biggest secrets in space.

Molds Tough Organisms

Molds evidently have been hardy veteran travelers along the threshold of true space since the Earth assumed its present form. This discovery was made in the last quarter-century when atmospheric samplings at extreme altitudes revealed the presence of these micro-organisms and germs in this hostile environment in a state of suspended animation. Returned to the surface and placed in a food culture under favorable laboratory conditions, they immediately resumed the normal life processes of reproduction and growth.

How these parasites and bacteria survive the severe temperatures of heat and cold or the heavy dosages of celestial radiations they receive mystifies scientists. Nor is it known how long the samplings examined since the study began were traveling in space with their life processes dormant.

Not all forms of this microscopic life are enemies of man. The blue mold is used in the manufacture of roquefort cheese; another fungus yields the antibiotic, penicillin, and still another, yeast, is essential in baking, brewing, distilling, and wine making. The villains are the molds such as plant rust which attacks crops, breadmold which spoils breadstuffs, and mildew which damages clothing and furniture.

American scientists believe that once an instrumented cone containing a packet of ordinary yeast is put in orbit they will be able to learn from it as much as the Soviets learned from their *Sputnik* dog, Liaka, possibly more. But for ill chance that data might be coming in now for the *Vanguard* destroyed in launch at the start of February did carry yeast to test the reaction of a living organism to the sustained absence of gravity, or weightlessness.

The performance of yeast also would throw light on whether the carbon dioxide a man would exhale on a space mission could be recycled satisfactorily to keep him provided with an adequate oxygen supply.

Scientists give the following description of what could be learned from the behavior of this sac fungus in orbit.

Yeast is a living organism able to carry on the basic biochemical functions of higher organisms.

The single cell is the basic unit of life, and a yeast packet represents a population of such cells. With space in an instrumented orbiting cone at a premium, yeast has the advantage of containing a large population in the familiar grocery store cake.

Many reactions of living organisms to physical stresses are initiated in the individual cell. This is not to minimize the importance of dealing with mulitcelled organisms like mice, monkeys, or larger sized experimental animals. However, pulse rate, heart beat, and other manifestations of such complex creatures are what physicians refer to as "gross reactions." If these are abnormal, the scientist can recognize that fact at once but with the subject remote from him he cannot put his finger on the specific cause for the abnormal manifestation.

A final advantage of yeast is that the oxygen it requires to function need not come from the cone's atmosphere but can be drawn from food.

In the absence of oxygen yeasts are able to obtain the energy for metabolism by feeding on sugar which chemically contains 12 carbon, 22 hydrogen, and 11 oxygen atoms. Yeast causes sugars to ferment in its presence. Like animal or human respiration, although with less energy produced, the fermentation uses sugar and releases carbon dioxide. When oxygen is available respiration provides further breakdown to water and carbon dioxide with much greater energy release. Plants, on the other hand, use water and carbon dioxide in the presence of light to manufacture plant tissue and release excess oxygen by "breathing" it back into the atmosphere.

The *Vanguard's* yeast packet was packaged in a piston. Had the launch been successful, pressure in the piston would have built up as the yeast gave off carbon dioxide in the fermentation process. This was to have been recorded by ground monitoring stations recording changes in the broadcast frequency caused by the movement of the piston.

Such readings on the carbon dioxide buildup in the piston could then be compared with that produced by a similar cake of yeast and fermenting sugar in a surface laboratory. Thus science would be given an invaluable insight into how the biochemical and growth processes of that basic unit of all life—the single cell—react to the condition of gravitational effects during weightlessness. The deductions possible from a comparison like this would be of great moment in aeromedical research and far reaching in application.

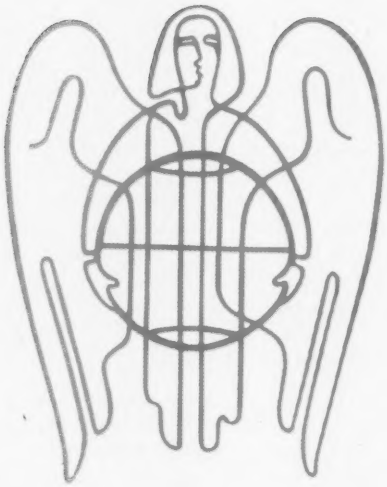
When the yeast experiment is again tried, the piston will be shielded like the first one against cosmic rays and other radiation so that the effects of weightlessness can be isolated.

—WILLIAM A. KINNEY

CODE OF THE AIR RESCUEMAN

It is my duty, as a member of Air Rescue Service, to save life and to aid the injured. I will be prepared at all times to perform my assigned duties quickly and efficiently, placing these duties before personal desires and comforts.

These things I do ***that others may live.***



GUARDIAN ANGELS OF THE AIRWAYS

Heroism is routine to men of the Air Rescue Service whose farflung units save hundreds of lives every year.

by Dave Karten

SHORTLY after 10 o'clock in the evening last July 3rd, a MATS C-124 *Globemaster* left Hickam AF Base on a routine flight to Wake Island. Three hours later a dead cylinder in the number three engine caused excessive backfiring and the pilot of the giant transport reversed his course and headed back toward Honolulu. It was 0127 hours, July 4th.

One minute later an alert sounded at the 76th Air Rescue Squadron. An SC-54 prepared for takeoff. At 0133 hours the *Globemaster* radioed that it couldn't feather the prop on the ailing engine and requested permission to fly to Johnston Island, some 200 miles away. At 0136 hours the new course was cleared and acknowledged by the aircrew with a request to standby for a new position report. This was the last word from the transport. Survivors later reported that the number three prop broke away, sliced through the fuselage, and cut all electrical and radio lines. A controlled "ditching" was effected in spite of lost aileron control but the right wing "dug in" on impact and the aircraft broke off behind the flight deck. At least five of the nine-man crew got out of the sinking aircraft.

Meantime at Hickam, the 76th checked its map that covers five-and-a-half million square miles of ocean, and narrowed the search area to a 60-mile band on each side of the last reported position. The rescue detachment at Johnston, alerted at 0142 hours, sent its SC-54s on an expanding square search. The 1502d Air Transport Wing added five C-124s, the 6486th Air Base Wing, two C-54s, and the Coast Guard an R5D to the search.

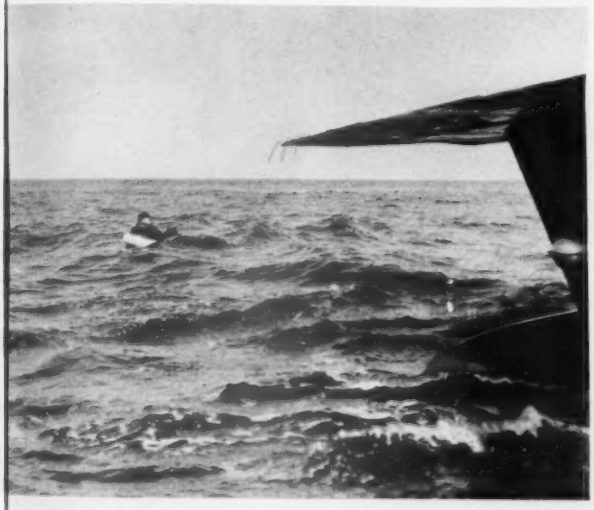
The aircraft carrier *USS Boxer*, enroute from Eniwetok to Pearl Harbor, was diverted to the area by the Navy. Seven other surface ships were ordered into the area.

Shortly after noon, one of the Air Rescue SC-54s spotted an oil slick and three survivors in the water. Within minutes the rescuemen dropped an MA-1 kit and radioed the *USS Boxer* to dispatch helicopters to effect a pickup.

And with that, the three survivors added their gratitude and names to the thousands before them who have been "saved" from death by the USAF Air Rescue Service.

To the Air Rescue pilots it was all in the day's work. "Saving lives," they explained, "happens to be our business."

Air Force rescue facilities were established soon after American planes began swarming everywhere early in World War II, to lend a hand to the fliers who went down. Today, rescue squadrons literally cover the globe and stand ready to act in a broad range of emergencies. Every day, somewhere around the world, the Air Rescue Services' highly skilled, well organized "death cheaters" go about their delicate and dangerous errands of mercy. Their squadrons are divided among groups scattered from the tropics to the polar seas. Wherever they are, they're ready, every hour of the day or night, to help men, planes, or ships in trouble—be they military or civilian. (See *In the Name of Humanity,* THE AIRMAN, October '58.)



More interested in action than statistics, Air Rescue Service (now a branch of MATS) hasn't kept track of the exact number of lives it has saved since it was organized in 1947. A conservative estimate would be well up in the thousands and the figure grows day by day. Nearly 10,000 "saves" were made in Korea alone where rescue planes and helicopters evacuated the more seriously wounded from the front, pulled UN aircrews out of the sea, and under enemy fire snatched to safety nearly a thousand allied fighting men trapped behind enemy lines.

One of these rescues involved Capt. Ken Stewart who bailed out into the Taedong River behind enemy lines after his *Mustang* was crippled by gunfire. It was dusk when he landed in the water. Pilots in his squadron reported his position to Air Rescue.

Capt. John J. Najarian and his four-man crew were eating supper at the ARS station when the alert sounded. In minutes their twin-engine *Albatross* roared into the air. They found Stewart's buddies circling their planes over the dark Taedong trying to break up Communist ground fire from the river bank by strafing. One of the fighters turned on his landing lights and dived toward the place Stewart was last seen. Captain Najarian followed him down and landed on the river.

Captain Stewart was clinging to his rubber dinghy in the reeds about a half mile upstream from where the *Albatross* landed. Attached to his rubber boat was a one-cell flashlight which he began blinking toward the plane. Najarian gunned the *Albatross* toward the light, then pulled up alongside. Ignoring the gunfire, the crew fished Stewart out.

As Captain Najarian taxied around he made out the black mass of a high point of land projecting into the sea and silhouetted against the slightly grayer sky. This was all the horizon he had and he took off toward it. He skillfully lifted the SA-16 over the promontory at the last moment, and headed home. At headquarters, Najarian and his crew chalked up another "routine mission" and finished supper. The next morning Stewart was once more flying against the enemy instead of being a captured pilot.

Battle "Taxi" Service

It was in Korea that the Air Rescue Service came into its own. Under combat conditions ARS accomplishments added a new dimension to the concept of aerial rescue. Prior to then, Air Rescue techniques were largely experimental. But by developing and standardizing rescue techniques and procedures they had reached a high degree of reliability.

The helicopter established itself as an invaluable rescue vehicle. Many famous pilots, including triple jet ace Capt. Joe McConnell, were picked up and returned to fly again because of Air Rescue's battle "taxi" service. Air Rescue was responsible, to a large degree, for the remarkably low mortality rate among the wounded—only about half the World War II incident rate. By helicopter, severely wounded men who couldn't have survived ground transportation were airlifted from frontline aid stations to hospitals in the rear within minutes of being wounded. In less than half an hour ARS helicopters accomplished evacuations which often would have required a full day of tortuous overland travel.

The accomplishments of Air Rescue Service personnel have bordered on the legendary and a list of their most outstanding exploits would be impressively long. Any such list would have to include the air rescue of Capt. Thomas L. Pittman in the depth of winter in sub-Arctic Canada.

It was 1350 hours February 12, 1955, when one of five 22d Bomb Wing B-47s, on a polar training flight from Thule to March AFB, exploded over northern Saskatchewan, 100 miles north of The Pas, Manitoba, Canada. The *Stratojet's* commander and pilot parachuted to safety in the cold, bleak, heavily-wooded timber country that was once the site of the Old Hudson Bay trading post. Both were rescued. The observer, knocked unconscious by the explosion, was fatally injured.

Captain Pittman, the fourth crew member, was hurtled through a gaping hole in the crew compartment and sucked

out the rear of the aircraft. With his leg broken he lay injured and helpless in the snow and subzero cold of the northern Saskatchewan bush for more than three days without food or shelter.

On the fourth day his eyes were fixed most of the time upon a rabbit he had shot with one of two cartridges in his pistol. The rabbit lay just out of Captain Pittman's reach. The other cartridge he was saving for the time when his amazing endurance might be exhausted. Now and then he took his eyes off the rabbit to look prayerfully into the leaden winter skies. Once an amphibian aircraft, painted with the yellow markings of the rescue service, passed through the dreary grayness and disappeared.

Meanwhile Lts. Dale Harris and Jim Bradford, pilots of an SA-16 and Capt. Philip Warren, Jr., the navigator, had flown from Hamilton AFB, Calif., to take part in this two-nation search. In Denver, they loaded up with Arctic flying and survival equipment, and arrived at Winnipeg RCAF station late on a February night with the temperature 15 below and the wind blowing in 35-knot gusts. By the time they winterized their engines, it was almost daybreak. They slept three hours and took off for the advance search base, The Pas, a little trapping and lumbering village 500 miles north of the United States border. Upwards of 75 men and a dozen aircraft were already combing the area.

For two days the SA-16 searched the frozen wastes at tree-top level. Then weather began closing in. On the fourth day of their mission, it started to snow. The crew knew that if Pittman was alive, they must find him soon.

A Tiny Red Object

As the SA-16 established radio contact with a helicopter, breaking into a right turn to clear the craft, Captain Warren noticed for a fraction of a second a tiny red object. He reported it to the helicopter. The H-19 pilot replied that it was probably a panel put down by ground parties working the area. Such panels were used as markers and guides for both air and ground crews. The weather, alternating between zero-zero and 500 feet, closed in before they could get back over the area to investigate.

For four hours the *Albatross* crew orbited about the base camp set up on a frozen lake. They covered the helicopter, relayed messages, controlled the going and coming of other aircraft, and kept thinking of the tiny red object Warren had seen. Then suddenly the weather lifted. They asked the copter pilot to point out panels left by land rescue teams. Neither color nor location of the panels jibed with the red object.

Now the seemingly hopeless task of relocating the dot in the forested wilderness faced the rescue crew and the amazing powers of observation and memory of detail that a search pilot must develop were brought into play. Lieutenant Harris recalled he had seen a piece of metal resting on a glacier just before the red object had been sighted. He duplicated his southern heading over the glacier and repeated his quick pattern of four hours earlier. Again Captain Warren saw the red object. Two more passes brought the object closer, and the crew could now see a parachute and, miraculously, a man waving at them. Within a few minutes a paramedic lifted Captain Pittman into a helicopter's sling and on his way to safety.

© Grumman Aircraft Engineering Corp.

To the Rescue—Air Rescue Service's primary aircraft, with others available as needed, are the SA-16 *Albatross* and the SH-19 helicopter. The *Albatross* (bottom photo) is a big two-engined craft able to land on water, dry land, snow, or ice. The USAF's standard air-sea rescue amphibian, it was used to save the lives of more than 900 men in Korea; and has been used on mercy missions the world over. An example of the fine job the SH-19 does was a recent Pacific rescue (top photo) in which 39th ARS personnel saved 14 Japanese sailors after their ship, *Tanda Maru*, went aground and was breaking up on a reef. High winds had whipped the waves to a height of 18 feet during the operation.

The Jumpers

Constituting an elite corps within Air Rescue Service are the paramedics—a breed apart and among the best trained airmen in the Armed Forces today.

Precision parachutists, highly trained medics, experts on survival under any earthly condition, they will jump anywhere and anytime a possibility exists that there is a life to be saved. They have parachuted into the Arabian desert and the jungles of Panama, and onto glaciers in Greenland—to make crash victims comfortable until help arrives overland.

Guts are their stock in trade. Radio commentator, Eric Sevareid, was in a group of survivors saved by jumpers during World War II. Of the men who risked their lives to save him, he later wrote, "Gallant is a precious word; they deserve it."

Saved Thousands of People

For heroic work in the face of natural disasters, rescue personnel have made headlines repeatedly during the past 12 years. Many of these disasters involved people of other countries and the exploits of Air Rescuemen have developed bonds of friendship that will never be broken. In the English and Dutch flood disasters in 1953, Air Rescue was credited with saving thousands of people.

In February 1947 Air Rescue participated in its first major flood action when the Mamore River flooded in Bolivia. Native villages were wiped out in an area of over 100 square miles. ARS established an airlift and, under most difficult conditions, carried hundreds to safety. One C-47 staggered aloft from a primitive airstrip with over 90 survivors aboard. To be sure, most were children but this figure may stand as some kind of record for the *Gooney Bird*.

Shortly after his rescue from the sea, T/Sgt. James M. Phillips, survivor of a C-124 that ditched near Johnston Island in July, is given first aid on flight deck of aircraft carrier by two USS *Boxer* sailors, BM2 Thomas Ochoa and HM2 Edward Gogan. *U. S. Navy Photo*

Injured Navy man is loaded aboard SH-19 by 48th ARS paramedics. Five minutes after being alerted that a Navy T-28 two-place trainer had crashed and was burning within a mile of nearby Crestview, Fla., an SA-16 *Albatross* and SH-19 were scrambled from the 48th at Eglin AFB, Fla. Within 13 minutes paramedics in the SA-16 had dropped a medical kit which they followed down immediately. Minutes later as the "chopper" landed, two survivors were spotted a short distance from the crash and given immediate medical attention. An hour and six minutes after being alerted, the copter landed in front of base operations and the patients were taken to Eglin's hospital where an emergency operation was performed on the more severely injured man.

The pages of ARS history are crowded with references to outstanding achievements in large scale disasters. Rescue directed all operations of the Department of Defense during the great floods in Japan, Italy, Mexico, Costa Rica, and at home in Kansas and Texas to mention but a few.

Rescue has been praised officially for flying in supplies and medical help and airlifting to safety critically injured survivors following earthquakes in Orleansville, Algeria, and Greece, and in a number of avalanche disasters in Austria, Italy, and Switzerland. In 1951 ARS flew in serum and medical aid to help check the yellow fever epidemic in tiny Costa Rica. The Republic of Haiti dedicated a stamp to the Air Rescue Service for the assistance rendered when that area was ravaged by Hurricane Hazel in October 1954.

In peace and war, Air Rescue's mission never changes. Since its creation, ARS has constantly worked to deploy its units strategically and economically to anticipate and be prepared at all times for any call for rescue. Standardization of search and rescue procedures has been polished to a high degree of proficiency. Flight safety among its farflung units has constantly been improved despite the extra hazards inherent in rescue flying.

The merciful nature of the ARS mission, and dedication to the credo *"that others may live"* have created a devotion to duty which compensates for the dangers that sometimes must be faced and hardships and long hours which rescuemen are required to put in. The nearly four score rescuemen who have died in line of duty since 1951 bear mute testimony to this devotion. The highly trained men who serve in rescue units around the globe personify the humanitarian belief that human life is the most precious commodity on Earth. They are living proof that the USAF, one of the most potent and destructive war machines ever known, has a heart as big and as vast as its airpower.

RESCUE
U.S AIR FORCE
RESCUE
U.S AIR FORCE
RESCUE
with a big salute
to GEN. DuBOSE and
all A.R.S. personnel
from STEVE CANYON
and Milton Caniff

WHAT MAKES YOU DO IT, YOU SCATTERED HANDFUL, JOINED
BY THE SLIM CORD OF DEDICATION BEYOND DUTY;
THE WILL TO ANSWER WHEN A FEAR-TAUT VOICE PROCLAIMS
THE IMMINENCE OF DARK REALITIES OF MISADVENTURE?
WHAT SUSTAINS YOU WHEN MEN AND METAL ARE PLUNGED INTO
DEFIANCE OF REVERED LAWS OF PHYSICS AND BEHAVIOR;
AND YOU, WITHOUT QUESTION, ACCEPT THE SAME PERILS OF LOWERING STORM
AND FICKLE CHANCE THAT BROUGHT THE CALLER TO SUCH LOW ESTATE?

NO WONDERMENT OF MINE COULD MATCH THE THOUGHTS OF DESPAIRING
HUMANS CLINGING TO CRASH-SPAWNED RAFTS;
CERTAIN IN HEART THAT NO MERE ELECTRONICS COULD FETCH SUCCOR
TO THIS ANCESTOR OF ALL THE NOWHERES OF RECORDED TIME.
LOST AS IT IS BETWEEN GRAY SKY AND GRAYER WATER, THIS MUST
BE THE EDGE OF EARTH DREADED BY MEN IN COLUMBUS' DAY—
UNTIL THE FIRST FAINT ENGINE SOUND RISES A DECIBEL ABOVE THE
EMPTY ROAR OF SILENCE AND DESPAIR...

COMPULSIVE, INTUITIVE REACTION CAUSES ONE MAN TO LEAP BEFORE
A MOVING TRAIN TO SAVE A FALLEN STRANGER, WHILE
DELIBERATE, MINUTELY EXECUTED MISSIONS FAR AT SEA IN HURRICANE
WEATHER ARE COMPULSION WITH A FLIGHT PLAN!
WE KNOW WHY MEN DARE SO GREATLY TO KILL, BUT NO GRAND BATTLE
PLOT OR PATRIOT'S VERVE DRIVES YOU TO PIT SKILL AGAINST THE ELEMENTS.
WE HAIL YOU, THEN, SOFTLY, RESPECTFUL OF YOUR REST BETWEEN LABORS,
SOFTER STILL FOR RESCUE MEN WHO TOOK THE LAST, LONG FLIGHT...
TO THOSE WHO PASSED THE POINT OF NO RETURN BECAUSE ANOTHER
HUMAN'S MAYDAY CRY FELL UPON SELFLESS EARS.

WE WRITE "WELL DONE"—AND CLOSE THE KEY.

MILTON CANIFF

IN THE PUBLIC EYE...

YOU are the AIR FORCE

DRIVE COURTEOUSLY!